## IMPORTANT SAFETY NOTICE

| | |
|---|---|
| **⚠ WARNING** | **Indicates a strong possibility of severe personal injury or death if instructions are not followed.** |
| **CAUTION** | **Indicates a possibility of equipment damage if instructions are not followed.** |
| **NOTE** | *Gives helpful information.* |

Detailed descriptions of standard workshop procedures, safety principles and service operations are not included. It is important to note that this manual contains some warnings and cautions against some specific service methods which could cause **PERSONAL INJURY** to service personnel or could damage a vehicle or render it unsafe. Please understand that those warnings could not cover all conceivable ways in which service, whether or not recommended by Honda, might be done or of the possible hazardous consequences of each conceivable way, nor could Honda investigate all such ways. Anyone using service procedures or tools, whether or not recommended by Honda must satisfy himself thoroughly that neither personal safety nor vehicle safety will be jeopardized by the service method or tools selected.

**Type Codes**

- Throughout this manual, the following abbreviations are used to identify individual type.
- The asterisk (*) indicates that this manual is applicable for the corresponding area type.

| Code | Available | Area type |
|---|---|---|
| ED | * | European direct sales |
| E | * | U.K. |
| F | * | France |
| IIG | * | Germany |
| U | | Australia |
| SA | | South Africa |
| ND | | North Europe |
| SW | | Switzerland |
| SD | | Sweden |
| FI | | Finland |
| N | | Norway |
| IT | | Italy |
| SP | | Spain |
| B | | Belgium |
| H | | Netherland |
| AR | | Austria |
| D (DK, DM) | | General export (km/h, mph) |
| II PO | | Portugal |

# HOW TO USE THIS MANUAL

This service manual describes the service procedures for the CLR 125.

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition.

Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

Sections 1 and 3 apply to the whole scooter. Section 2 describes procedures for removal/installation of components that may be required to perform service described in the following sections.
Sections 4 through 18 describe parts of the scooter, grouped according to location.

Find the section you want on this page, then turn to the table of contents on the first page of the section.

Most sections start with an assembly or system illustration, service information and troubleshooting for the section. The subsequent pages give detailed procedures.

If you don't know the source of the trouble, go to section 20, Troubleshooting.

> All information, illustrations, directions and specifications included in this publication are based on the latest product information available at the time of approval for printing. **HONDA MOTOR CO., LTD.** reserves the right to make changes at any time without notice and without incurring any obligation whatever, no part of this publication may be reproduced without written permission. This manual is written for persons who have acquired basic knowledge of maintenance on Honda Motorcycles, Motor Scooters or ATVS.

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## Symbols

The symbols used throughout this manual show specific service procedures. If supplementary information is required pertaining to these symbols, it would be explained specifically in the next without the use of the symbols.

| | |
|---|---|
| NEW | Replace the part(s) with new one(s) before assembly. |
| OIL | Use recommended engine oil, unless otherwise specified. |
| MO OIL | Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1:1). ✓ |
| GREASE | Use multi-purpose grease (Lithium based multi-purpose grease NLGI # 2 or equivalent). |
| M | Use molybdenum disulfide grease (containing more than 3% molybdenum disulfide, NLGI # 2 or equivalent).<br>Example: Molykote - BR-2 plus manufactured by Down Corning, U.S.A.<br>Multi-purpose M-2 manufactured by Mitsubishi Oil, Japan. |
| MP | Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI # 2 or equivalent).<br>Example: Molykote - G-n paste, manufactured by Down Corning, U.S.A.<br>Honda Moly 60 (U.S.A. only)<br>Rocol ASP manufactured by Rocol Limited, U.K.<br>Rocol Paste manufactured by Sumico Lubricant, Japan. |
| S | Use silicone grease. ✓ |
| LOCK | Apply a locking agent. Use a middle strength locking agent unless otherwise specified. |
| SEAL | Apply sealant. ✓ |
| BRAKE FLUID | Use DOT 4 brake fluid. Use the recommended brake fluid unless otherwise specified. |
| FORK | Use Fork or Suspension Fluid. |

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# 1. General Information

| | | | |
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## General Safety

### Carbon Monoxide

In the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area.

⚠ **WARNING**

- **The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death.**

Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

### Gasoline

Work in a well ventilated area. Keep cigarettes, flames or sparks away from the work area or where gasoline is stored.

**WARNING**

- **Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.**

### Hot Components

**WARNING**

- **Engine and exhaust system parts become very hot and remain hot for some time after the engine is run. Wear insulated gloves or wait until the engine and exhaust system have cooled before handling these parts.**

### Used Engine Oil

**WARNING**

- **Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil. KEEP OUT OF REACH OF CHILDREN.**

### Brake Dust

Never use an air hose or dry brush to clean brake assemblies. Use a vacuum cleaner or alternate method to minimize the hazard caused by air borne asbestos fibers.

⚠ **WARNING**

- **Inhaled asbestos fibers have been found to cause respiratory disease and cancer.**

### Brake Fluid

**CAUTION**

- **Spilling fluid on painted, plastic or rubber parts will damage them. Place a clean shop towel over these parts whenever the system is serviced. KEEP OUT OF REACH OF CHILDREN.**

### Battery Hydrogen Gas & Electrolyte

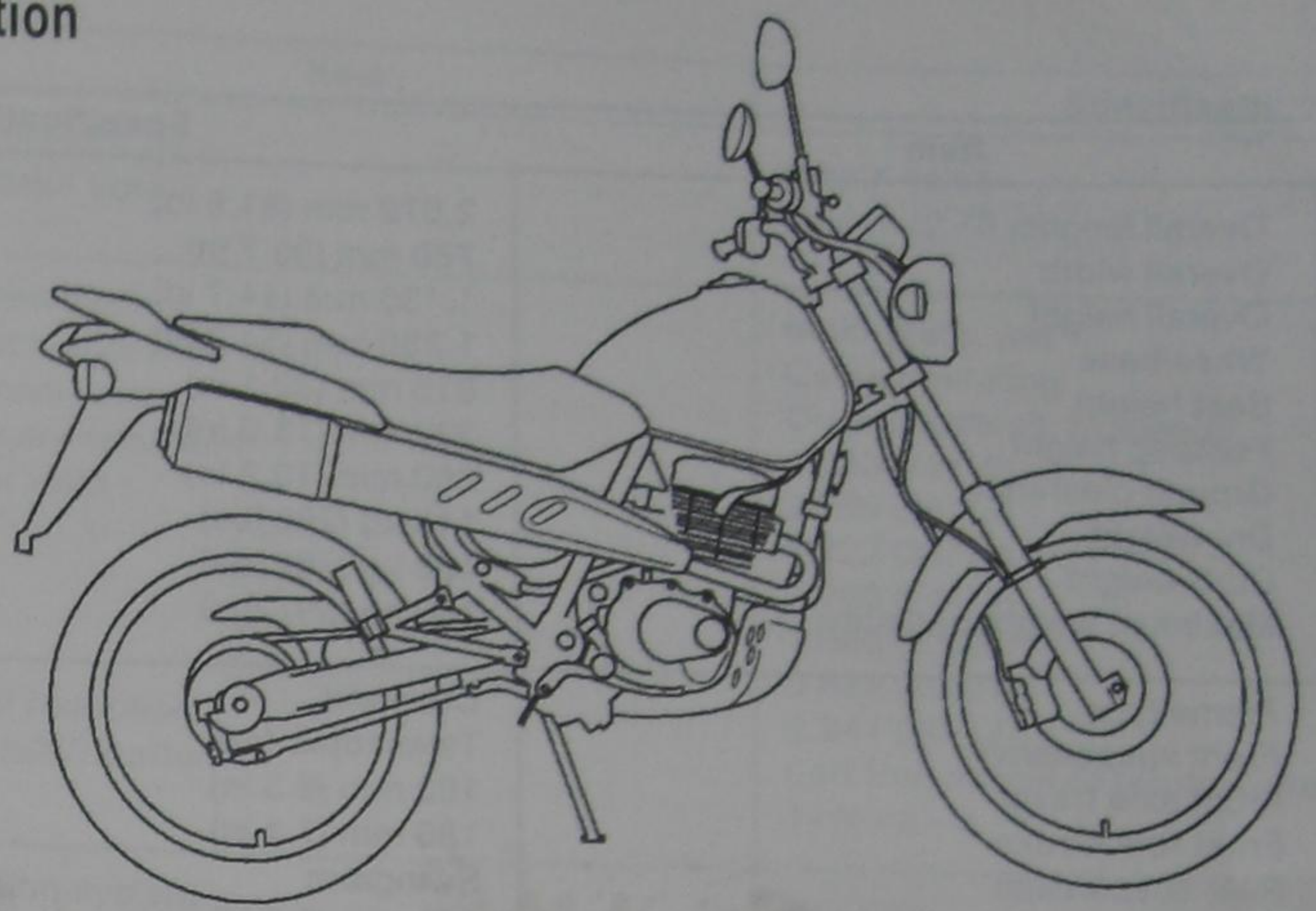
⚠ **WARNING**

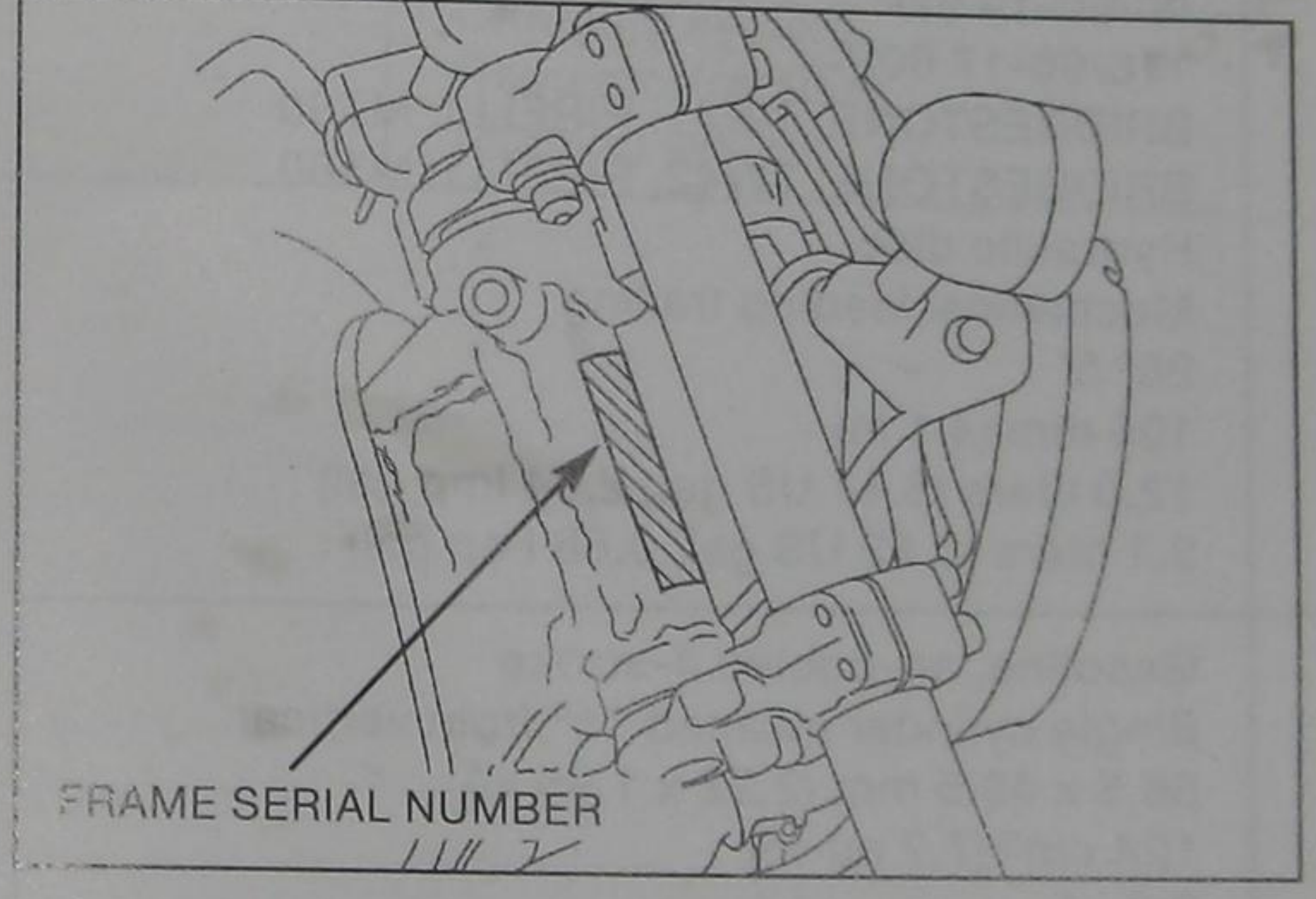
- **The battery gives of explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging or using the battery in an enclosed space.**
- **The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.**
  - **If electrolyte gets on your skin, flush with water.**
  - **If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.**
- **Electrolyte is poisonous.**
  - **If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician. KEEP OUT OF REACH OF CHILDREN.**

## Service Rules

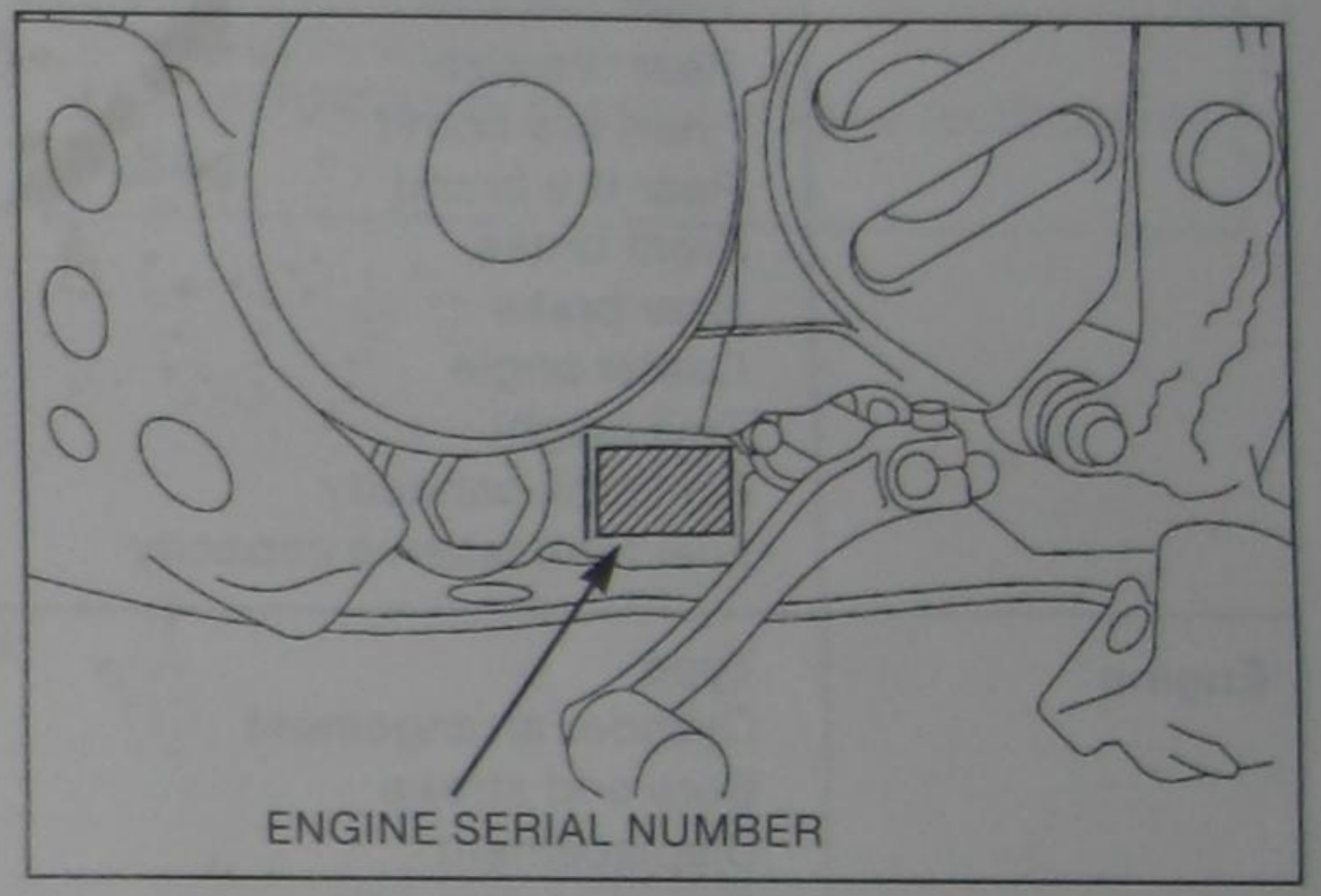
1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that don't meet HONDA'S design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown on pages 1-16 through 1-20, Cable & Harness routing.

## Model Identification

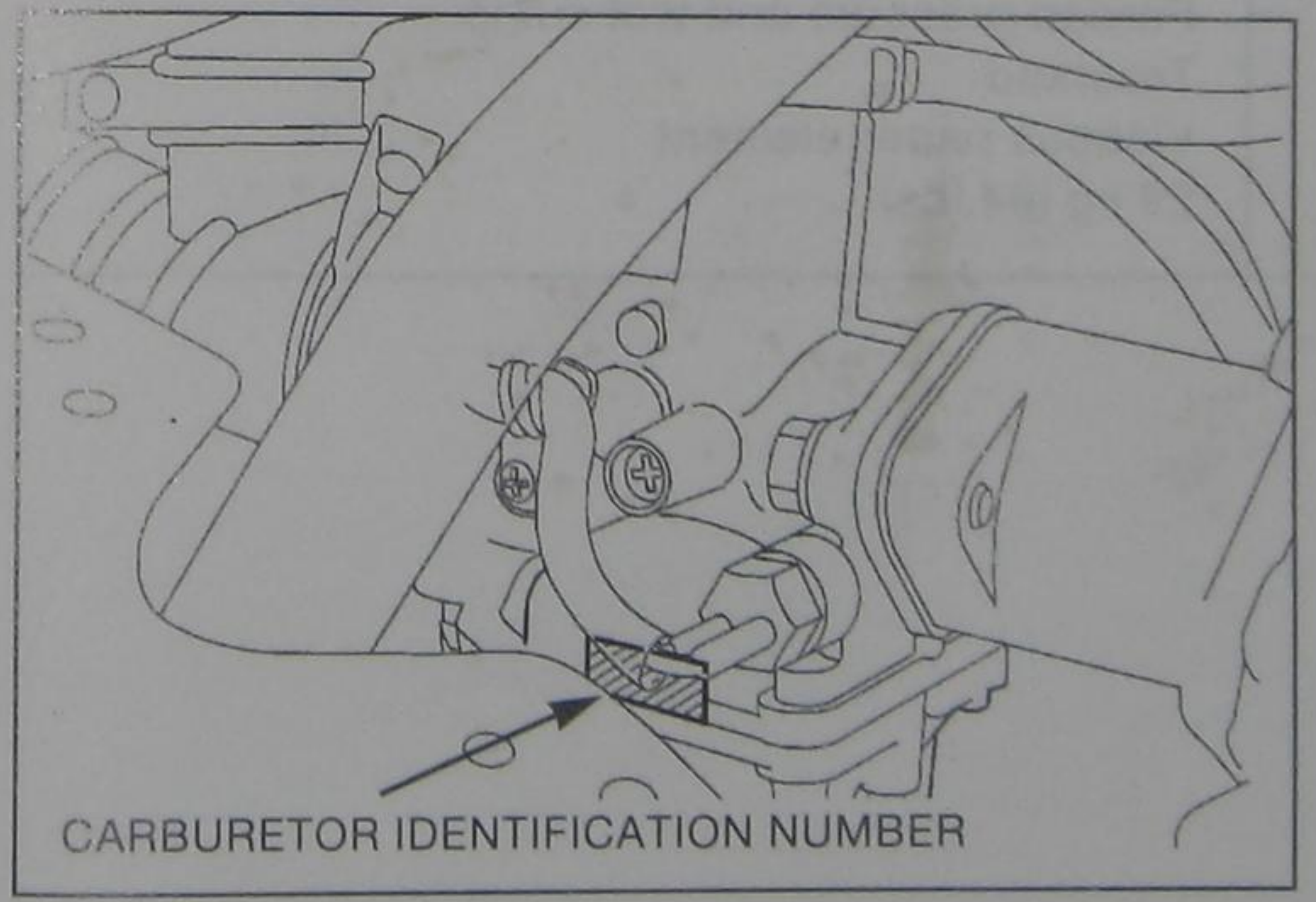




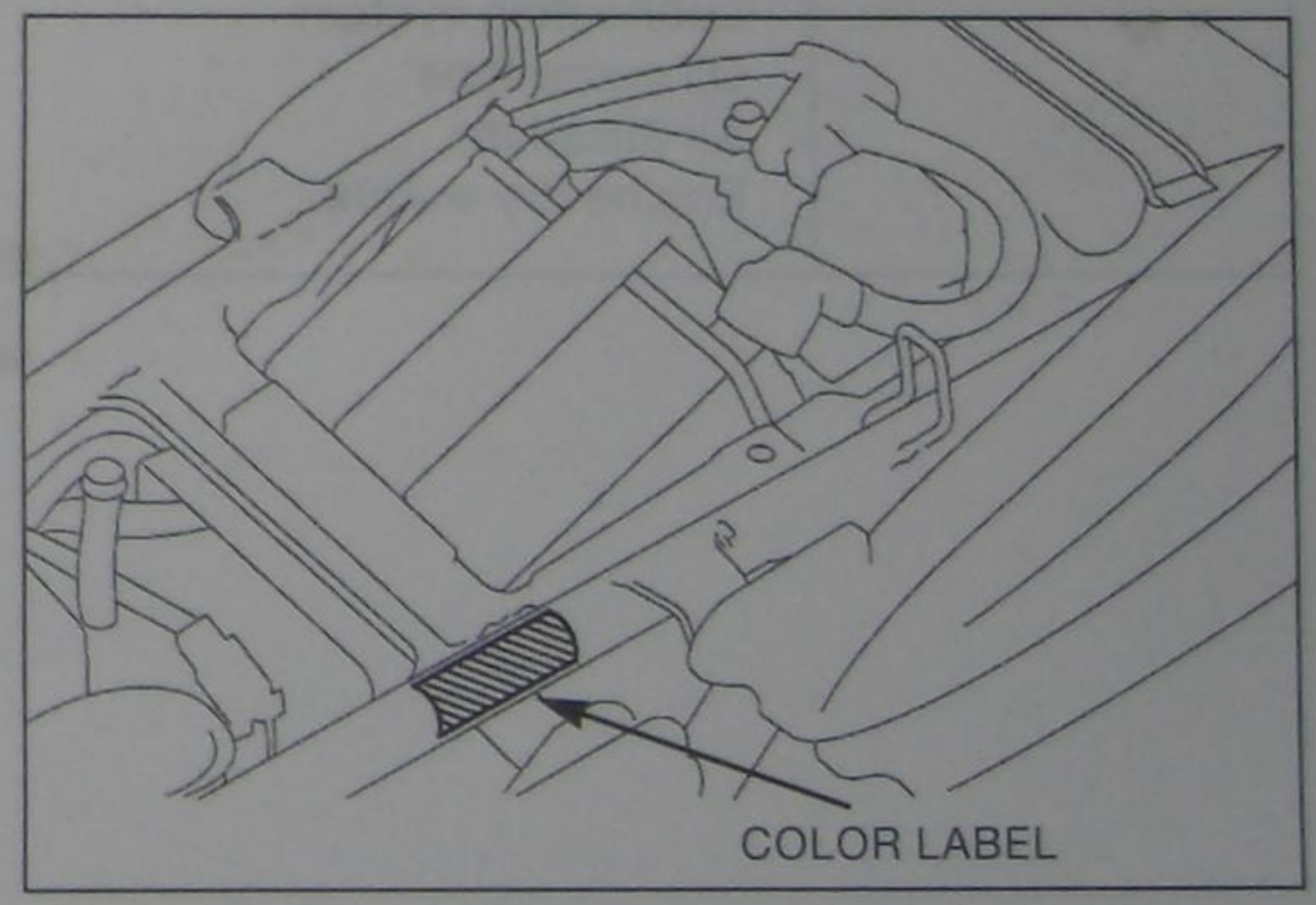
The frame serial number is stamped on the right side of the steering head.



The engine serial number is stamped on the lower left side of the crankcase.



The carburetor identification number is stamped on the right side of the carburetor body.



The color label is attached on the frame tube under the seat. When ordering color-coded parts, always specify the designated color code.

## Specifications

Unit: mm (in)

General

| | Item | Specifications |
|---|---|---|
| **Dimensions** | Overall lenght | 2,070 mm (81.5 in) |
| | Overall width | 780 mm (30.7 in) |
| | Overall height | 1,135 mm (44.7 in) |
| | Wheelbase | 1,380 mm (54.3 in) |
| | Seat height | 815 mm (32.1 in) |
| | Footpeg height | 330 mm (13.0 in) |
| | Ground clearance | 260 mm (10.2 in) |
| | Dry weight | 118 kg (260 lbs) |
| | Curb weight | 128 kg (282 lbs) |
| | Maximum weight capacity | 180 kg (397 lbs) |
| **Frame** | Frame type | Diamond |
| | Front suspension | Telescopic fork |
| | Front axle travel | 162 mm (6.3 in) |
| | Front fork stroke | 180 mm (7.1 in) |
| | Rear suspension | Swingarm |
| | Rear axle travel | 128 mm (5.0 in) |
| | Front tire size | 90/90-19 52P |
| | Rear tire size | 110/90-17 60P |
| | Front tire brand | BRIDGESTONE: TW41, PIRELLI: MT60 |
| | Rear tire brand | BRIDGESTONE: TW42, PIRELLI: MT60 |
| | Front brake | Hydraulic disc |
| | Rear brake | Mechanical leading trailing |
| | Caster angle | 28° 5' |
| | Trail lenght | 105 mm (4.1 in) |
| | Fuel tank capacity | 12.0 liters (3.17 US gal, 2.64 Imp gal) |
| | Fuel tank reserve capacity | 3.1 liters (0.82 US gal, 0.68 Imp gal) |
| **Engine** | Type | Gasoline, air-cooled 4-stroke |
| | Cylinder arrangement | Single cylinder inclined 15° from vertical |
| | Bore and stroke | 56.5 x 49.5 mm (2.22 x 1.95 in) |
| | Displacement | 124 cm$^3$ (7.7 cu-in) |
| | Compression ratio | 9.2 : 1 |
| | Valve train | Chain driven, SOHC |
| | Intake valve opens | 15° BTDC (At 1 mm lift) |
| | closes | 20° ABDC (At 1 mm lift) |
| | Exhaust valve opens | 35° BBDC (At 1 mm lift) |
| | closes | 0° ATDC (At 1 mm lift) |
| | Lubrication system | Forced pressure and wet sump |
| | Oil pump type | Trochoid |
| | Air filtration | Viscous paper element |
| | Engine dry weight | 29 kg (64 lbs) |

General (Cont`d)

Unit: mm (in)

| | Item | Specifications |
|---|---|---|
| **Carburetor** | Carburetor type | Piston valve |
| | Throttle bore | 20 mm (0.78 in) |
| **Drive Train** | Clutch system | Multi-plate, wet |
| | Clutch operation system | Cable operating |
| | Transmission | Constant mesh, 5-speeds |
| | Primary reduction | 4.055 (73/18) |
| | Gear ratio 1st | 2.769 (36/13) |
| | 2nd | 1.722 (31/18) |
| | 3rd | 1.263 (24/19) |
| | 4th | 1.000 (22/22) |
| | 5th | 0.838 (26/31) |
| | Final reduction | 2.941 (50/17) |
| | Gearshift pattern | Left foot operated return system,<br>1 - N - 2 - 3 - 4 - 5 |
| **Electrical** | Ignition system | DC-CDI |
| | Starting system | Electric starter motor |
| | Charging system | Triple phase alternator |
| | Regulator/rectifier | SCR shorted/triple phase, full wave rectification |
| | Lighting system | Battery |

Unit: mm (in)

## Lubrication System

| Item | | Standard | Service Limit |
|---|---|---|---|
| Engine oil capacity | At draining | 1.0 liter (1.06 US qt, 0.88 Imp qt) | — |
| | At disassembly | 1.2 liters (1.27 US qt, 1.06 Imp qt) | — |
| Recommended engine oil | | Honda 4-stroke oil or equivalent motor oil<br>API service classification: SE<br>Viscosity: SAE 10W-30 | — |
| Oil pump | Tip clearance | 0.15 (0.006) | 0.20 (0.008) |
| | Body clearance | 0.15-0.21 (0.006-0.008) | 0.35 (0.014) |
| | Side clearance | 0.03-0.12 (0.001-0.005) | 0.15 (0.006) |

## Fuel System

| Item | Specifications |
|---|---|
| Identification number | PDC5B |
| Venturi diameter | 22 mm (87 in) |
| Main jet | #100 |
| Slow jet | #38 x #38 |
| Jet needle clip position | 3rd groove |
| Float level | 14 mm (0.55 in) |
| Pilot screw initial opening | 1 — 1/2 turns out |
| Idle speed | 1,400 ± 100 min⁻¹ (rpm) |
| Throttle grip free play | 2-6 mm (1/12-1/4 in) |

## Cylinder Head/Valves

| Item | | | Standard | Service Limit |
|---|---|---|---|---|
| Cylinder compression | | | 1,373 ± 98 kPa (14.0 ± 1.0 kgf/cm², 199 ± 14 psi) at 600 min⁻¹ (rpm) | — |
| Valve clearance | | IN | 0.10 ± 0.02 (0.004 ± 0.001) | — |
| | | EX | 0.10 ± 0.02 (0.004 ± 0.001) | — |
| Camshaft | Cam lobe height | IN | 31.402-31.582 (1.2363-1.2434) | 31.10 (1.224) |
| | | EX | 31.082-31.262 (1.2237-1.2308) | 30.70 (1.209) |
| | Runout | | — | 0.05 (0.002) |
| Cylinder head warpage | | | — | 0.10 (0.004) |
| Rocker arm | I.D | | 12.000-12.018 (0.4724-0.4731) | 12.05 (0.474) |
| | Shaft O.D | | 11.966-11.984 (0.4711-0.4718) | 11.93 (0.470) |
| | Rocker arm-to-shaft clearance | | 0.016-0.052 (0.0006-0.0020) | 0.08 (0.003) |
| Valve | Stem O.D | IN | 5.450-5.465 (0.2146-0.2052) | 5.42 (0.213) |
| | | EX | 5.430-5.445 (0.2138-0.2144) | 5.40 (0.213) |
| | Guide I.D | IN | 5.475-5.485 (0.2156-0.2159) | 5.50 (0.217) |
| | | EX | 5.475-5.485 (0.2156-0.2159) | 5.50 (0.217) |
| | Stem-to guide clearance | IN | 0.010-0.035 (0.0004-0.0014) | 0.08 (0.003) |
| | | EX | 0.030-0.055 (0.0012-0.0022) | 0.10 (0.004) |
| | Spring free length | Outer | 44.9 (1.77) | 43.5 (1.71) |
| | | Inner | 39.2 (1.54) | 38.0 (1.50) |
| Valve seat width | | | 1.1-1.3 (0.04-0.05) | 1.5 (0.06) |

## Cylinder/Piston

Unit: mm (in)

| Item | | | Standard | Service Limit |
|---|---|---|---|---|
| Cylinder | I.D. | | 56.500-56.510 (2.2244-2.2248) | 56.60 (2.228) |
| | Out of round | | — | 0.08 (0.003) |
| | Taper | | — | 0.05 (0.002) |
| | Warpage | | — | 0.05 (0.002) |
| Piston, piston ring, piston pin | Piston O.D. | | 56.470-56.490 (2.4988-2.4996) | 56.42 (2.221) |
| | Piston pin hole I.D. | | 15.002-15.008 (0.5906-0.5909) | 15.04 (0.592) |
| | Piston pin O.D. | | 14.994-15.000 (0.5903-0.5906) | 14.96 (0.589) |
| | Piston-to-piston pin clearance | | 0.002-0.014 (0.0001-0.0006) | 0.07 (0.003) |
| | Piston ring-to-groove clearance | Top | 0.015-0.045 (0.0006-0.0018) | 0.10 (0.004) |
| | | Second | 0.015-0.045 (0.0006-0.0018) | 0.10 (0.004) |
| | Piston ring end gap | Top | 0.05-0.20 (0.002-0.008) | 0.05 (0.02) |
| | | Second | 0.05-0.20 (0.002-0.008) | 0.05 (0.02) |
| | | Oil (side rail) | 0.20-0.70 (0.008-0.028) | 0.09 (0.04) |
| Cylinder-to-piston clearance | | | 0.010-0.040 (0.0004-0.0016) | 0.15 (0.006) |
| Connecting rod small end I.D. | | | 15.010-15.028 (0.5909-0.5917) | 15.06 (0.593) |
| Connecting rod-to-piston pin clearance. | | | 0.010-0.034 (0.0004-0.0013) | 0.10 (0.004) |

## Clutch/Gearshift Linkage

Unit: mm (in)

| Item | | | Standard | Service Limit |
|---|---|---|---|---|
| Clutch | Lever free play | | 10-20 (3/8-3/4) | — |
| | Spring free length | | 34.7 (1.37) | 31.7 (1.25) |
| | Disc thickness | | 2.90-3.00 (0.114-0.118) | 2.6 (0.10) |
| | Plate warpage | | — | 0.20 (0.008) |
| | Outer I.D. | | 28.000-28.021 (1.1024-1.1032) | 28.04 (1.104) |
| | Outer guide | O.D. | 27.959-27.980 (1.1007-1.1015) | 27.93 (1.100) |
| | | I.D. | 19.983-19.996 (0.7867-0.7872) | 20.02 (0.788) |
| Mainshaft O.D. at clutch outer guide. | | | 19.967-19.980 (0.7861-0.7866) | 19.92 (0.784) |

Unit: mm (in)

**Crankcase/Transmission/Crankshaft**

| Item | | | Standard | Service Limit |
|---|---|---|---|---|
| Shift fork | I.D. | | 12.000-12.018 (0.4724-0.4731) | 12.05 (0.474) |
| | Claw thickness | | 4.93-5.00 (0.194-0.197) | 4.70 (0.185) |
| | Shaft O.D. | | 11.976-11.994 (0.4715-0.4722) | 11.90 (0.469) |
| Transmission | Gear I.D. | M3, C4 | 20.020-20.041 (0.7882-0.7890) | 20.07 (0.790) |
| | | M5, C2 | 23.020-23.041 (0.9063-0.9071) | 23.07 (0.908) |
| | | C1 | 19.520-19.541 (0.7685-0.7693) | 19.57 (0.770) |
| | Bushing O.D. | M5 | 22.984-23.005 (0.9049-0.9057) | 22.93 (0.903) |
| | | C1 | 19.479-19.500 (0.7667-0.7677) | 19.43 (0.765) |
| | | C2 | 22.979-23.000 (0.9047-0.9055) | 22.93 (0.903) |
| | Bushing I.D. | M5 | 20.020-20.041 (0.7882-0.7890) | 20.10 (0.791) |
| | | C1 | 16.516-16.534 (0.6502-0.6509) | 16.60 (0.654) |
| | | C2 | 20.000-20.021 (0.7874-07882) | 20.10 (0.791) |
| | Gear-to-bushing clearance | M5 | 0.015-0.057 (0.0006-0.0022) | 0.10 (0.004) |
| | | C1, C2 | 0.020-0.062 (0.0008-0.0024) | 0.10 (0.004) |
| | Mainshaft O.D. | At M3, M5 | 19.959-19.980 (0.7875-0.7866) | 19.91 (0.784) |
| | Countershaft O.D. | At C1 bushing | 16.466-16.484 (0.6483-0.6490) | 16.41 (0.646) |
| | | At C2 bushing | 19.974-19.987 (0.7864-0.7869) | 19.91 (0.784) |
| | | At C4 gear | 19.959-19.980 (0.7875-0.7866) | 19.91 (0.784) |
| | Gear-to-shaft clearance | M3, C4 | 0.040-0.082 (0.0016-0.0032) | 0.111 (0.0044) |
| | Bushing-to-shaft clearance | M5 | 0.040-0.082 (0.0016-0.0032) | 0.111 (0.0044) |
| | | C1 | 0.032-0.068 (0.0013-0.0027) | 0.096 (0.0038) |
| | | C2 | 0.013-0.047 (0.0005-0.0019) | 0.10 (0.004) |
| Crankshaft | Runout | | — | 0.10 (0.004) |
| | Big end side clearance | | 0.05-0.30 (0.002-0.012) | 0.5 (0.02) |
| | Big end radial clearance | | 0-0.008 (0-0.0003) | 0.05 (0.002) |

**Front Wheel/Suspension/Sttering**

Unit: mm (in)

| Item | | Standard | Service Limit |
|---|---|---|---|
| Minimum tire tread depth | | — | 3.0 (0.12) |
| Cold tire pressure | Driver only | 175 kPa (1.75 kgf/cm², 25 psi) | — |
| | Driver and passenger | 175 kPa (1.75 kgf/cm², 25 psi) | — |
| Front axle runout | | — | 0.20 (0.008) |
| Front wheel rim runout | Radial | — | 2.0 (0.08) |
| | Axial | — | 2.0 (0.08) |
| Fork spring free length | | 587.6 (23.13) | 579.3 (22.81) |
| Fork tube runout | | — | 0.20 (0.008) |
| Fork fluid capacity | | 384 cm³ (12.9 US oz, 13.5 Imp oz) | — |
| Fork fluid level | | 140 (5.5) | — |

**Rear Wheel/Brake/Suspension**

Unit: mm (in)

| Item | | Standard | Service Limit |
|---|---|---|---|
| Minimum tire tread depth | | — | 3.0 (0.12) |
| Cold tire pressure | Driver only | 175 kPa (1.75 kgf/cm², 25 psi) | — |
| | Driver and passenger | 200 kPa (2.00 kgf/cm², 29 psi) | — |
| Rear axle runout | | — | 0.20 (0.008) |
| Real wheel rim runout | Radial | — | 2.0 (0.08) |
| | Axial | — | 2.0 (0.08) |
| Rear brake drum I.D. | | 130 (5.1) | 131 (5.2) |
| Rear brake lining thickness | | 4.0 (0.16) | 2.0 (0.08) |
| Rear brake pedal free play | | 20-30 (3/4 — 1-1/4) | — |
| Drive chain slack | | 25-35 (1—1-3/8) | — |

**Hydraulic Disc Brake**

Unit: mm (in)

| Item | Standard | Service Limit |
|---|---|---|
| Specified brake fluid | DOT 4 | — |
| Brake disc thickness | 3.8-4.2 (0.15-0.17) | 3.5 (0.14) |
| Brake disc runout | — | 0.30 (0.012) |
| Master cylinder I.D. | 12.700-12.743 (0.500-0.5017) | 12.75 (0.502) |
| Master cylinder piston O.D. | 12.657-12.684 (0.4983-0.4994) | 12.65 (0.498) |
| Caliper cylinder I.D. | 25.020-25.050 (0.9850-0.9862) | 25.06 (0.987) |
| Caliper piston O.D. | 24.960-24.980 (0.9827-0.9835) | 24.95 (0.982) |

**Battery/Charging System**

| Item | | | Specifications |
|---|---|---|---|
| Battery | Capacity | | 12 V - 4 Ah |
| | Voltage at 20°C (68°F) | Fully charged | Above 12.8 V |
| | | Needs charging | Below 12.3 V |
| | Charging rate | Normal | 0.5 A/5-10 h |
| | | Quick | 5 A/0.5 h |
| | Current leakage | | 1 mA max. |
| Regulator/rectifier regulated voltage | | | 14.0-14.8 V/5,000 min$^{-1}$ (rpm) |
| Alternator | Capacity | | 200 W/5,000 min$^{-1}$ (rpm) |
| | Charging coil at 20°C (68°F) | | 0.1 - 1.0 Ω |

**Ignition System**

| Item | | Specifications |
|---|---|---|
| Spark plug | NGK | DPR8EA-9 |
| | DENSO | X24EPR-U9 |
| Spark plug gap | | 0.8-0.9 mm (0.031-0.035 in) |
| Ignition coil peak voltage | | 100 V minimum |
| Ignition pulse generator peak voltage | | 0.7 V minimum |
| Ignition timing ("F" mark) | | 15° BTDC at idle |

Unit: mm (in)

**Electric Starter**

| Item | Standard | Service Limit |
|---|---|---|
| Starter motor brush length | 12.5-13.5 (0.49-0.51) | 8.5 (0.33) |

**Lights/Meters/Switches**

| Item | | | Specifications |
|---|---|---|---|
| Bulb | Headlight high/low beam | E type | 12 V - 35/35 W |
| | | Except E type | 12 V - 60/55 W |
| | Position light | | 12 V - 5 W |
| | Brake/taillight | | 12 V - 21/5 W |
| | Turn signal light | | 12 V - 10 W x 4 |
| | Meter light | | 12 V - 1.7 W |
| | High beam indicator | | 12 V - 1.7 W |
| | Neutral indicator | | 12 V - 1.7 W |
| | Turn signal indicator | | 12 V - 1.7 W |
| Fuse | Main fuse | | 20 A |
| | Sub fuse | | 10 A x 2, 15 A |

## Torque Values

**Standard**

| Fastener Type | Torque N·m (kgf-m, lbf-ft) | Fastener Type | Torque N·m (kgf-m, lbf-ft) |
|---|---|---|---|
| 5 mm bolt and nut | 5 (0.5, 3.6) | 5 mm screw | 4 (0.4, 2.9) |
| 6 mm bolt and nut | 10 (1.0, 7) | 6 mm screw | 9 (0.9, 6.5) |
| 8 mm bolt and nut | 22 (2.2, 16) | 6 mm flange bolt (8 mm head, small flange) | 10 (1.0, 7) |
| 10 mm bolt and nut | 34 (3.5, 25) | (8 mm head, large flange) | 12 (1.2, 9) |
| 12 mm bolt and nut | 54 (5.5, 40) | 6 mm flange bolt and nut (10 mm head) | 12 (1.2, 9) |
| | | 8 mm flange bolt and nut | 26 (2.7, 20) |
| | | 10 mm flange bolt and nut | 39 (4.0, 29) |

- Torque specifications listen below are for important fasteners.
- Others should be tightened to standard torque values listed above.

Notes:
1. Apply oil to the threads and seating surface.
2. Apply locking agent to the threads.
3. U-nut.
4. ALOC bolt: replace with a new one.
5. One-way bolt: replace with a new one.

**Engine**

| Item | Q'Ty | Thread Dia. (mm) | Torque N·m (kgf-m, lbf-ft) | Remarks |
|---|---|---|---|---|
| **MAINTENANCE:** | | | | |
| Spark plug | 1 | 12 | 18 (1.8, 13) | |
| Valve adjusting hole cap | 2 | 36 | 15 (1.5,11) | |
| Valve adjusting lock nut | 2 | 6 | 14 (1.4, 10) | NOTE 1 |
| Crankshaft hole cap | 1 | 30 | 8 (0.8, 5.8) | |
| Timing hole cap | 1 | 14 | 10 (1.0, 7) | |
| Oil strainer screen cap | 1 | 36 | 15 (1.5, 11) | |
| **LUBRICATION SYSTEM:** | | | | |
| Oil filter rotor cover screw | 3 | 5 | 5 (0.5, 3.6) | |
| Pump plate attaching screw | 2 | 4 | 3 (0.3, 2.2) | |
| Oil pump mounting screw | 2 | 6 | 10 (1.0, 7) | |
| **FUEL SYSTEM:** | | | | |
| Carburetor heater | 1 | — | 8 (0.8, 5.8) | |
| **ENGINE REMOVAL/INSTALLATION:** | | | | |
| Drive sprocket bolt (IIG type) | 2 | 6 | 11 (1.1, 8) | NOTE 5 |
| **CYLINDER HEAD/VALVE:** | | | | |
| Cam chain tensioner slider pivot bolt | 1 | 8 | 10 (1.0, 7) | |
| Cam sprocket bolt | 2 | 6 | 12 (1.2, 9) | |
| Cylinder head cover cap nut | 4 | 8 | 26 (2.7, 20) | NOTE 1 |
| Cylinder head socket bolt | 1 | 6 | 10 (1.0, 7) | |
| Cam chain tensioner mounting bolt | 2 | 6 | 12 (1.2, 9) | |
| Cam chain tensioner sealing screw | 1 | 6 | 4 (0.4, 2.9) | |
| **CLUTCH/GEARSHIFT LINKAGE:** | | | | |
| Oil filter rotor lock nut | 1 | 16 | 83 (8.5, 61) | NOTE 1 |
| Clutch center lock nut | 1 | 16 | 83 (8.5, 61) | NOTE 1 |
| Gearshift drum stopper arm bolt | 1 | — | 12 (1.2, 9) | |
| Clutch lifter plate bolt | 4 | 6 | 12 (1.2, 9) | |
| Gearshift pedal bolt | 1 | 6 | 12 (1.2, 9) | |
| **ALTERNATOR/STARTER CLUTCH:** | | | | |
| Ignition pulse generator mounting bolt | 2 | 5 | 5 (0.5, 3.6) | NOTE 2 |
| Stator bolt | 3 | 6 | 10 (1.0, 7) | |
| Starter clutch bolt | 6 | 6 | 16 (1.6, 12) | NOTE 2 |
| Flywheel bolt | 1 | 10 | 74 (7.5, 54) | NOTE 1 |
| **CRANKCASE/TRANSMISSION/CRANKSHAFT:** | | | | |
| Mainshaft bearing setting plate bolt | 2 | 6 | 12 (1.2, 9) | NOTE 2 |

Frame

| Item | Q'Ty | Thread Dia. (mm) | Torque N·m (kgf-m, lbf-ft) | Remarks |
|---|---|---|---|---|
| **FRAME/BODY PANELS/EXHAUST SYSTEM:** | | | | |
| Exhaust pipe joint nut | 2 | 6 | 10 (1.0, 7) | |
| Muffler mounting bolt | 2 | 8 | 32 (3.3, 24) | |
| Muffler band bolt | 1 | 8 | 20 (2.0, 14) | |
| Exhaust pipe cover bolt | 3 | 6 | 12 (1.2, 9) | |
| Muffler cover screw | 1 | 5 | 4 (0.4, 2.9) | |
| Fuel valve | 1 | 18 | 26 (2.7, 20) | |
| **MAINTENANCE:** | | | | |
| Headlight case mounting bolt | 2 | 8 | 22 (2.2, 16) | |
| Air cleaner housing cover screw | 4 | 5 | 1 (0.1,0.7) | |
| **ENGINE REMOVAL/INSTALLATION:** | | | | |
| Front engine hanger nut (engine side) | 2 | 8 | 34 (3.5, 25) | |
| (frame side upper) | 1 | 8 | 34 (3.5, 25) | |
| (frame side lower) | 1 | 10 | 34 (3.5, 25) | |
| Upper engine hanger nut | 3 | 8 | 34 (3.5, 25) | |
| Rear upper engine mounting nut | 1 | 10 | 49 (5.0, 36) | |
| Rear lower engine mounting nut | 1 | 10 | 59 (6.0, 43) | |
| **FRONT WHEEL/SUSPENSION/STEERING:** | | | | |
| Brake disc bolt | 6 | 6 | 20 (2.0, 14) | NOTE 4 |
| Front axle | 1 | 12 | 64 (6.5, 47) | |
| Front axle holder nut | 4 | 6 | 12 (1.2, 9) | NOTE 3 |
| Spoke nipple | 36 | BC 3.2 | 4 (0.4, 2.9) | |
| Fork socket bolt | 2 | 8 | 20 (2.0, 14) | NOTE 2 |
| Fork cap | 2 | 34 | 23 (2.3, 17) | |
| Fork top bridge pinch bolt | 4 | 8 | 27 (2.8, 20) | |
| Fork bottom bridge pinch bolt | 4 | 8 | 32 (3.3, 24) | |
| Steering top thread | 1 | 26 | 5 (0.5, 3.6) | Page 12-20 |
| Steering stem nut | 1 | 24 | 103 (10.5, 76) | |
| Handle holder bolt | 2 | 8 | 18-25 (1.8-2.5, 13-18) | |
| **REAR WHEEL/BRAKE/SUSPENSION:** | | | | |
| Final driven sprocket nut | 4 | 4 | 44 (4.5, 33) | NOTE 3 |
| Rear brake panel stopper arm nut | 2 | 8 | 22 (2.2, 16) | |
| Rear axle nut | 1 | 14 | 88 (9.0, 65) | NOTE 3 |
| Spoke nipple | 36 | BC 3.5 | 4 (0.4, 2.9) | |
| Rear brake arm pinch bolt | 1 | 6 | 10 (1.0, 7) | |
| Rear shock absorber mounting nut | 2 | 10 | 44 (4.5, 33) | NOTE 3 |
| Shock arm-to-swing arm nut | 1 | 12 | 103 (10.5, 76) | NOTE 3 |
| Shock link-to-shock arm nut | 1 | 10 | 44 (4.5, 33) | NOTE 3 |
| Shock link-to-frame nut | 1 | 10 | 44 (4.5, 33) | NOTE 3 |
| Swingarm pivot nut | 1 | 14 | 88 (9.0, 65) | NOTE 3 |
| **HYDRAULIC DISC BRAKE:** | | | | |
| Brake caliper bleed valve | 1 | 6 | 6 (0.6, 4.3) | |
| Master cylinder reservoir cap screw | 2 | 4 | 0.2 (2, 1.4) | |
| Brake caliper mounting bolt | 2 | 8 | 30 (3.1, 22) | NOTE 4 |
| Pad pin retainer plate bolt | 1 | 6 | 10 (1.0, 7) | |
| Brake hose oil bolt | 2 | 10 | 29 (3.0, 22) | |
| Brake lever pivot bolt | 1 | 6 | 10 (1.0, 7) | |
| nut | 1 | 6 | 10 (1.0, 7) | |
| Front brake light switch screw | 1 | 4 | 1 (0.1,0.7) | |
| Brake caliper pin bolt | 1 | 8 | 23 (2.3, 17) | NOTE 2 |
| Brake caliper pin bolt nut | 1 | 8 | 23 (2.3, 17) | NOTE 2 |
| Brake caliper assembly bolt | 2 | 10 | 54 (5.5, 40) | |
| Master cylinder holder bolt | 2 | 6 | 8-12 (0.8-1.2, 5.6-8.4) | |
| **BATTERY/CHARGING SYSTEM:** | | | | |
| Battery holder plate screw | 1 | 6 | 3 (0.3, 2.2) | |
| **LIGHT/METERS/SWITCHES:** | | | | |
| Ignition switch mounting bolt | 2 | 8 | 26 (2.7, 20) | NOTE 4 |
| **OTHERS:** | | | | |
| Side stand pivot bolt | 1 | 10 | 10 (1.0, 7) | |
| nut | 1 | 10 | 39 (4.0, 29) | |

## Tools

| Description | Tool Number | Ref. Section |
|---|---|---|
| Float level gauge | 07401-0010000 | 5 |
| Spoke wrench, 5.8 x 6.1 mm | 07701-0020300 | 3, 12, 13 |
| Valve adjusting wrench, 8 x 9 mm | 07708-0030100 | 3 |
| Lock nut wrench, 20 x 24 mm | 07716-0020100 | 9 |
| Gear holder | 07724-0010200 | 9 |
| Flywheel holder | 07725-0040000 | 10 |
| Rotor puller | 07733-0020001 | 10 |
| Valve guide driver, 5.5 mm | 07742-0010100 | 7 |
| Pin driver, 3 mm | 07744-0010200 | 9 |
| Attachment, 32 x 35 mm | 07746-0010100 | 9, 11, 12, 13 |
| Attachment, 42 x 47 mm | 07746-0010300 | 11, 12, 13 |
| Attachment, 52 x 55 mm | 07746-0010400 | 11 |
| Attachment, 72 x 75 mm | 07746-0010600 | 11 |
| Attachment, 22 x 24 mm | 07746-0010800 | 13 |
| Pilot, 15 mm | 07746-0040300 | 11, 12, 13 |
| Pilot, 17 mm | 07746-0040400 | 9, 13 |
| Pilot, 20 mm | 07746-0040500 | 11 |
| Pilot, 28 mm | 07746-0041100 | 11 |
| Bearing remover shaft | 07746-0050100 | 12, 13 |
| Bearing remover head, 15 mm | 07746-0050400 | 12, 13 |
| Driver | 07749-0010000 | 9, 11, 12, 13 |
| Valve spring compressor | 07757-0010000 | 7 |
| Seat cutter, 27.5 mm (45° EX) | 07780-0010200 | 7 |
| Seat cutter, 33 mm (45° IN) | 07780-0010800 | 7 |
| Flat cutter, 30 mm (32° EX) | 07780-0012200 | 7 |
| Flat cutter, 33 mm (32° IN) | 07780-0012900 | 7 |
| Interior cutter, 30 mm (60° IN/EX) | 07780-0014000 | 7 |
| Cutter holder, 5.5. mm | 07781-0010101 | 7 |
| Pilot screw wrench | 07908-4220201 | 5 |
| Snap ring pliers | 07914-SA50001 | 14 |
| Steering stem socket | 07916-KA50100 | 12 |
| Bearing remover set, 15 mm | 07936-KC10000 | 11 |
| - remover shaft | 07936-KC10100 | 11 |
| - remover head | 07936-KC10200 | 11 |
| - sliding weight | 07741-0010201 | 11 |
| Steering stem driver | 07946-4300101 | 12 |
| Driver shaft | 07946-MJ00100 | 13 |
| Driver head | 07946-MJ00200 | 13 |
| Fork seal driver | 07947-4630100 | 12 |
| Ball race remover | 07953-MJ10000 | 12 |
| - remover attachment | 07953-MJ10100 | 12 |
| - remover handle | 07953-MJ10200 | 12 |
| Valve adjusting screw | 07980-GE00100 | 3 |
| Valve guide reamer | 07984-0980001 | 7 |
| Clutch center holder | 07GMB-KT70101 | 9 |
| Peak voltage adaptor | 07HGJ-0020100 | 16 |
| Bushing driver | 07HMF-MM90200 | 13 |

## Lubrication & Seal Points

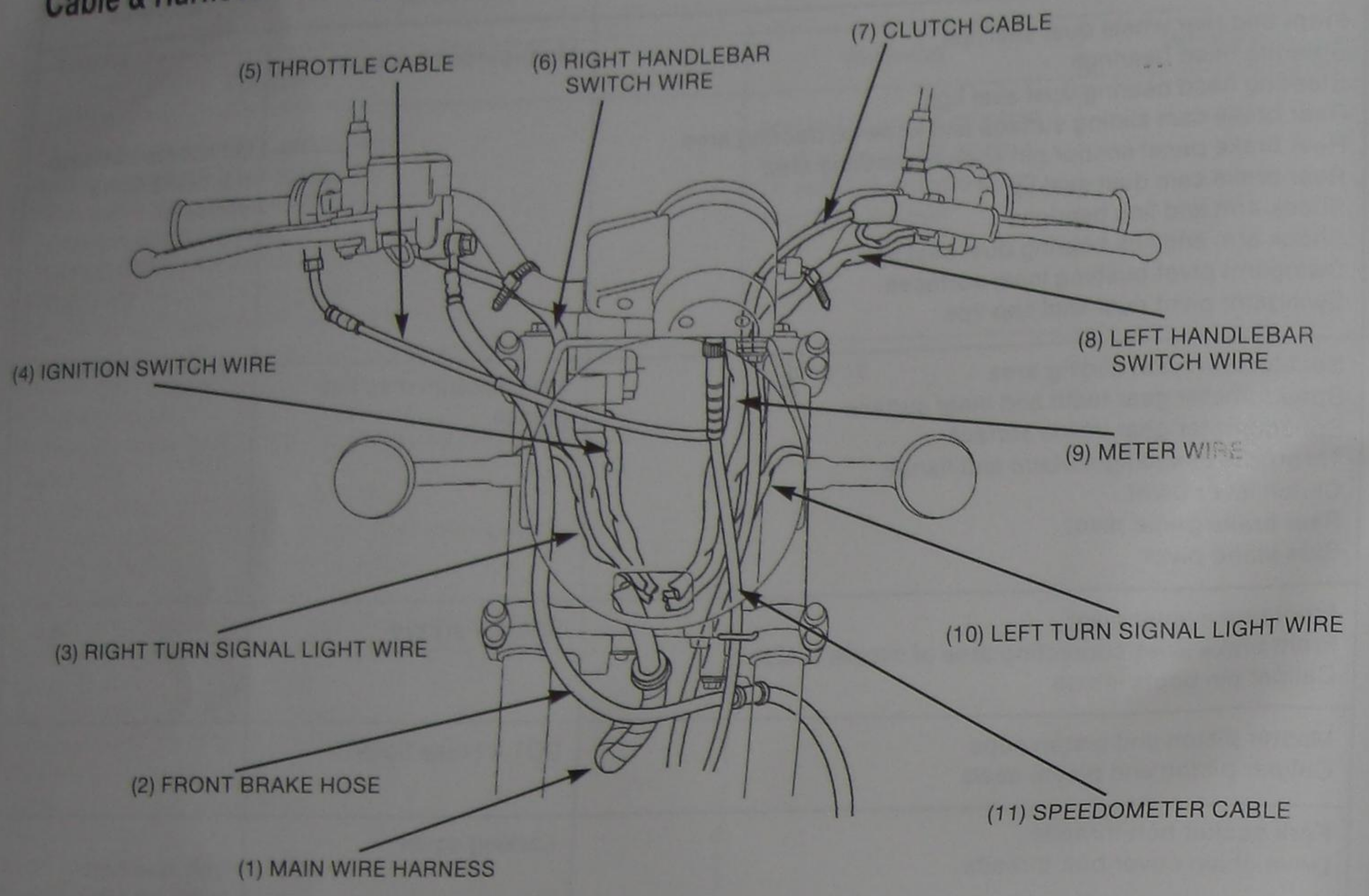
Engine

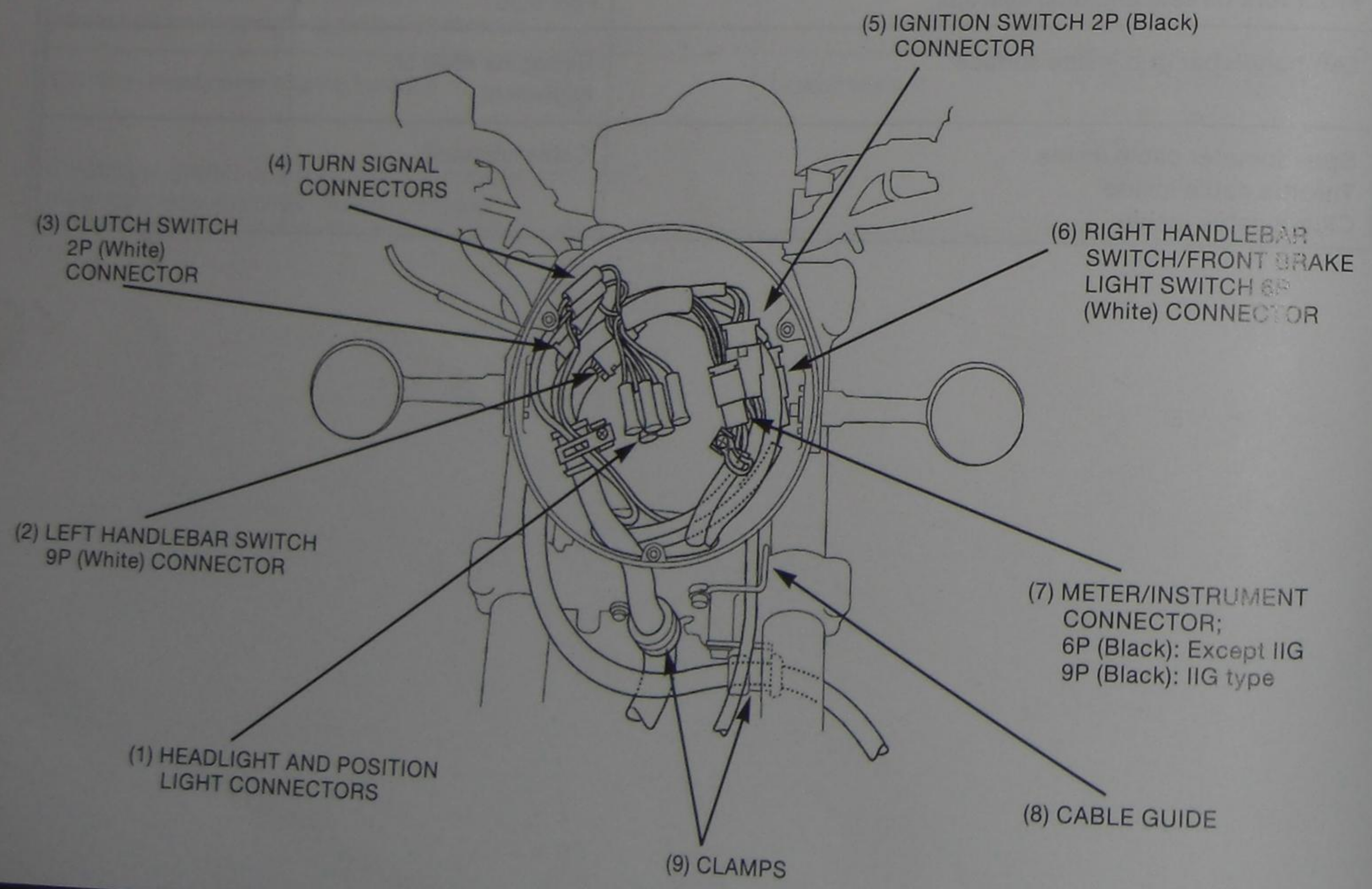
| Location | Material | Remarks |
|---|---|---|
| Camshaft bearings and cam lobes<br>Rocker arm shaft whole surfaces<br>Valve valve stem sliding surfaces<br>Piston pin outer surface<br>Clutch outer guide whole surface<br>M3 and M5 gear inner surfaces<br>C1, C2 and C4 gear inner surfaces | Molybdenum oil solution (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease) | |
| Oil through pipe sliding surface<br>Oil pump rotors<br>Valve adjusting lock nut threads and seating surfaces<br>Cam chain<br>Cylinder head cover cap nut threads<br>Valve adjusting lock nut threads and seating surfaces<br>Piston outer surface and piston rings<br>Clutch disc whole surfaces<br>Clutch center lock nut threads and seating surface<br>Oil filter rotor lock nut threads and seating surface<br>Sprag clutch sliding surfaces<br>Starter driven gear inner surface<br>Flywheel bolt threads and seating surface<br>Starter idle gear shaft<br>Starter reduction gear shaft<br>Each oil seal lip<br>Each bearing rotating surface<br>Each O-ring whole surface | Engine oil | |
| Ignition pulse generator bolt threads<br>Starter clutch outer bolt threads<br>Mainshaft bearing setting plate bolt threads | Locking agent | |
| Cylinder head cover mating surface<br>Crankcase gasket upper cut end (crankcase-cylinder)<br>Alternator wire grommet seating surface | Liquid sealant | Avoid getting into oil passage.<br>(page 7-17)<br>(page 8-6) |

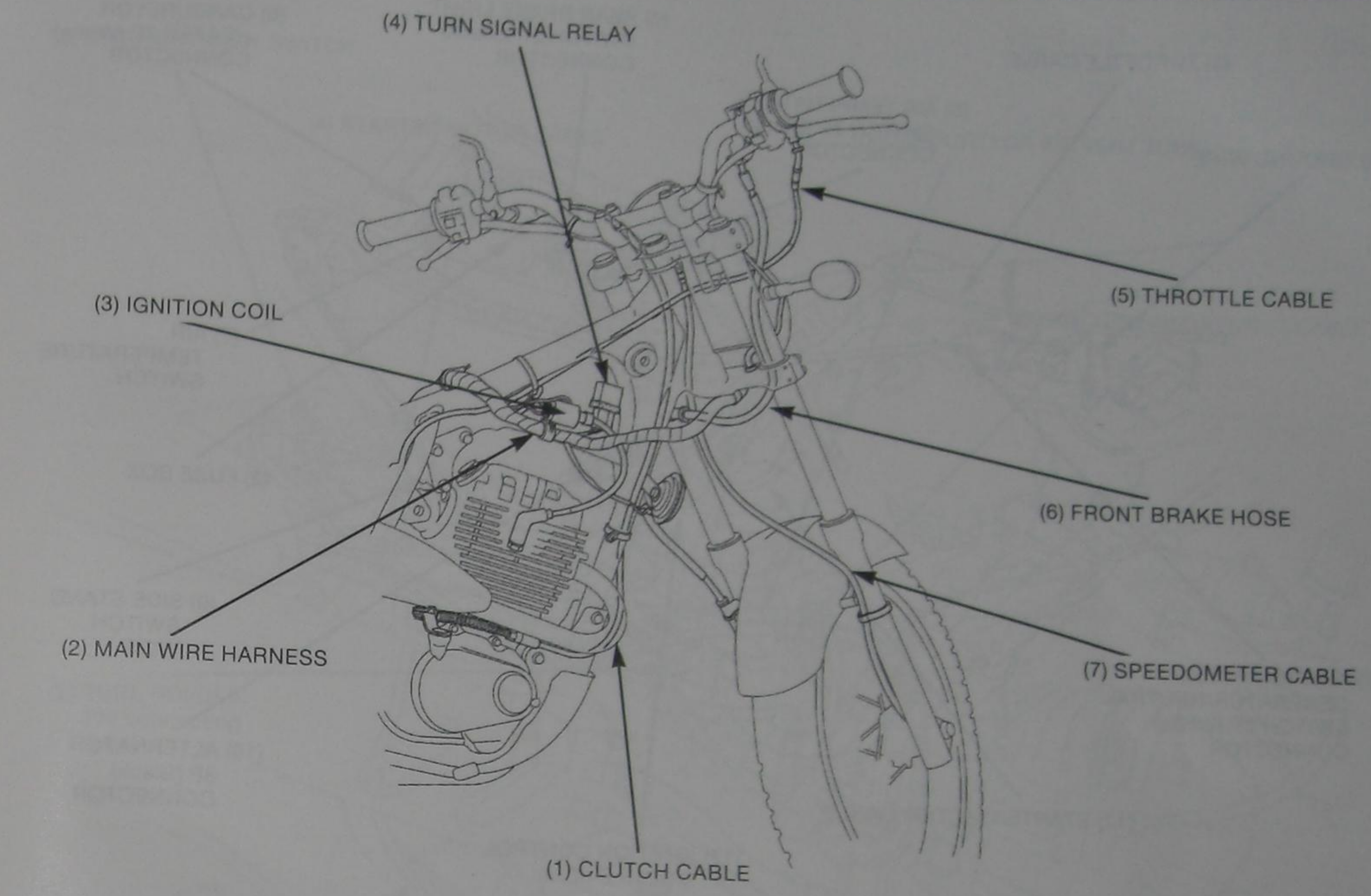
Frame

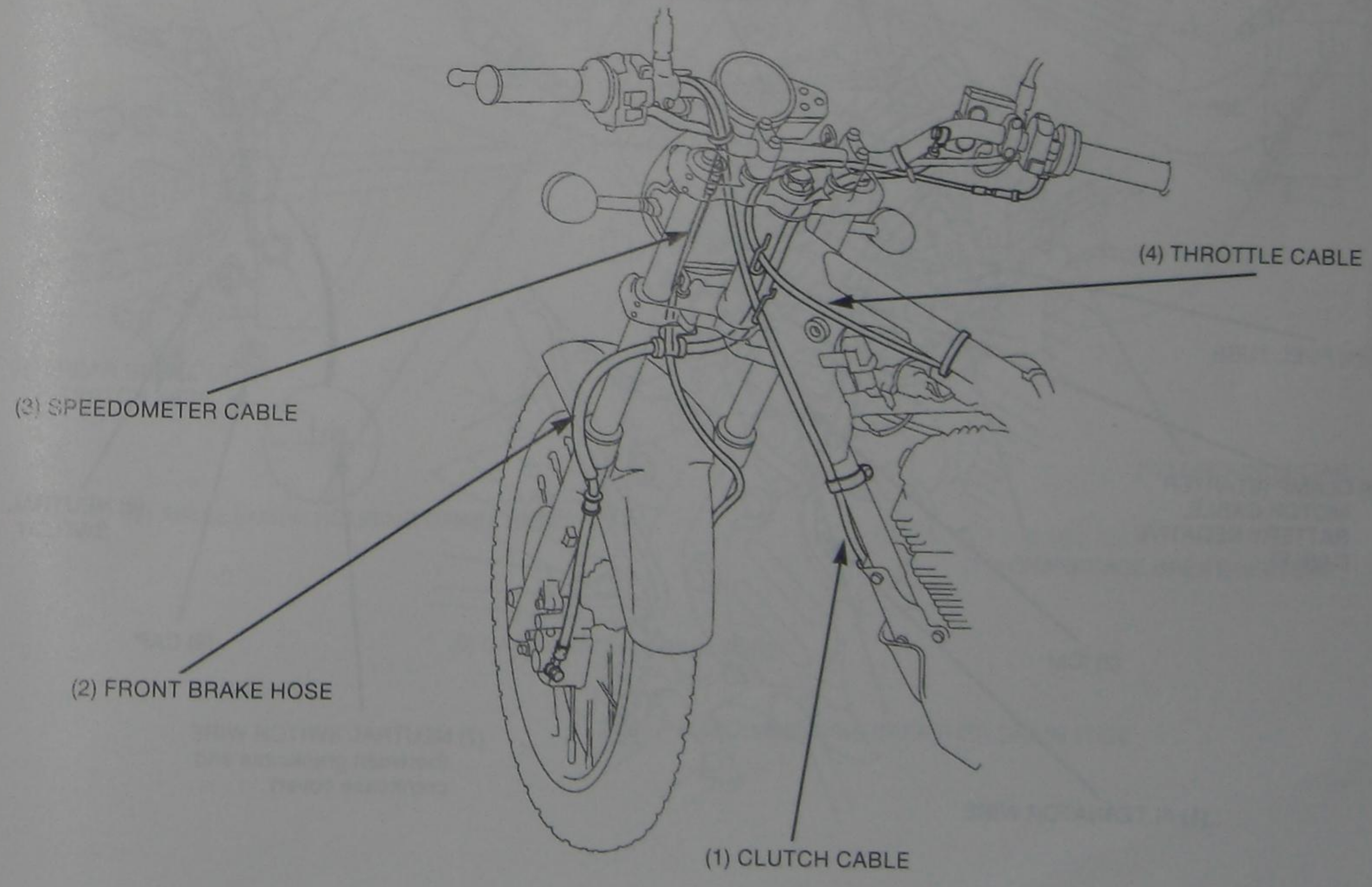
| Location | Material | Remarks |
|---|---|---|
| Front and rear wheel dust seal lips<br>Steering head bearings<br>Steering head bearing dust seal lips<br>Rear brake cam sliding surface and shoe contacting area<br>Rear brake panel anchor pin shoe contacting area<br>Rear brake cam dust seal lip<br>Shock arm and link beargins<br>Shock arm and link bearing dust seal lips<br>Swingarm pivot bushing inner surfaces<br>Swingarm pivot dust seal cap lips | Multi-purpose grease | Do not contaminate the brake lining surfaces |
| Seat lock bracket sliding area<br>Speedometer gear teeth and inner surface<br>Speedometer gear inside surface<br>Throttle grip sliding surface and flange<br>Clutch lever pivot<br>Rear brake pedal pivot<br>Side stand pivot | Molybdenum disulfide grease | |
| Front brake lever pivot<br>Front brake lever contacting area of master piston<br>Caliper pin boots inside | Silicone grease | |
| Master piston and piston cups<br>Caliper piston and piston seals | DOT 4 brake fluid | |
| Fork socket bolt threads<br>Drive chain cover bolt threads<br>Caliper pin bolt threads | Locking agent | Only one bolt<br>(page 13-17) |
| Front fork oil seal and dust seal lips | Fork fluid | |
| Left handlebar grip inside surface | Cemedine #540 or equivalent | |
| Speedometer cable inside<br>Throttle cable inside<br>Clutch cable inside | Cable lubricant | |

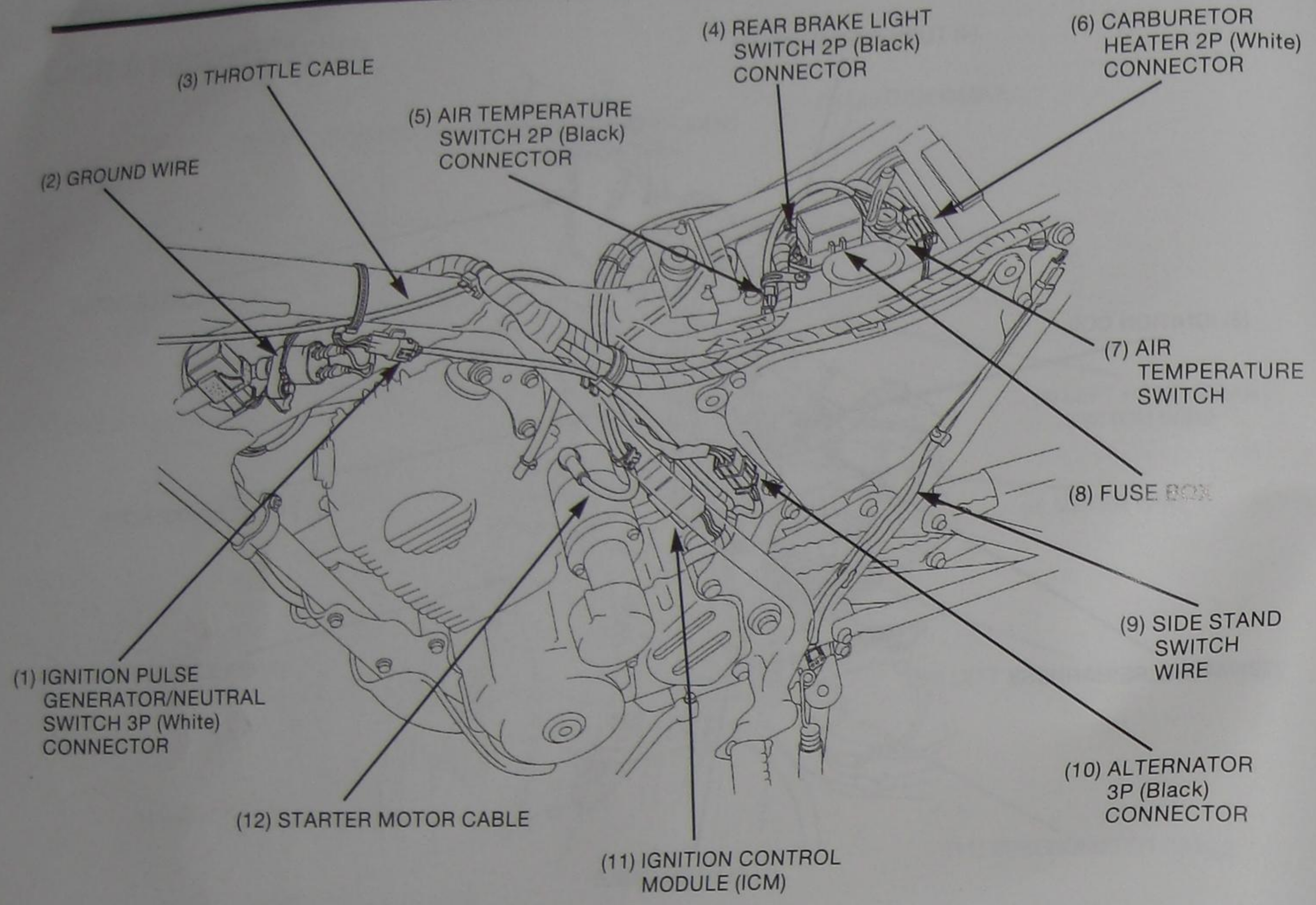
## Cable & Harness Routing

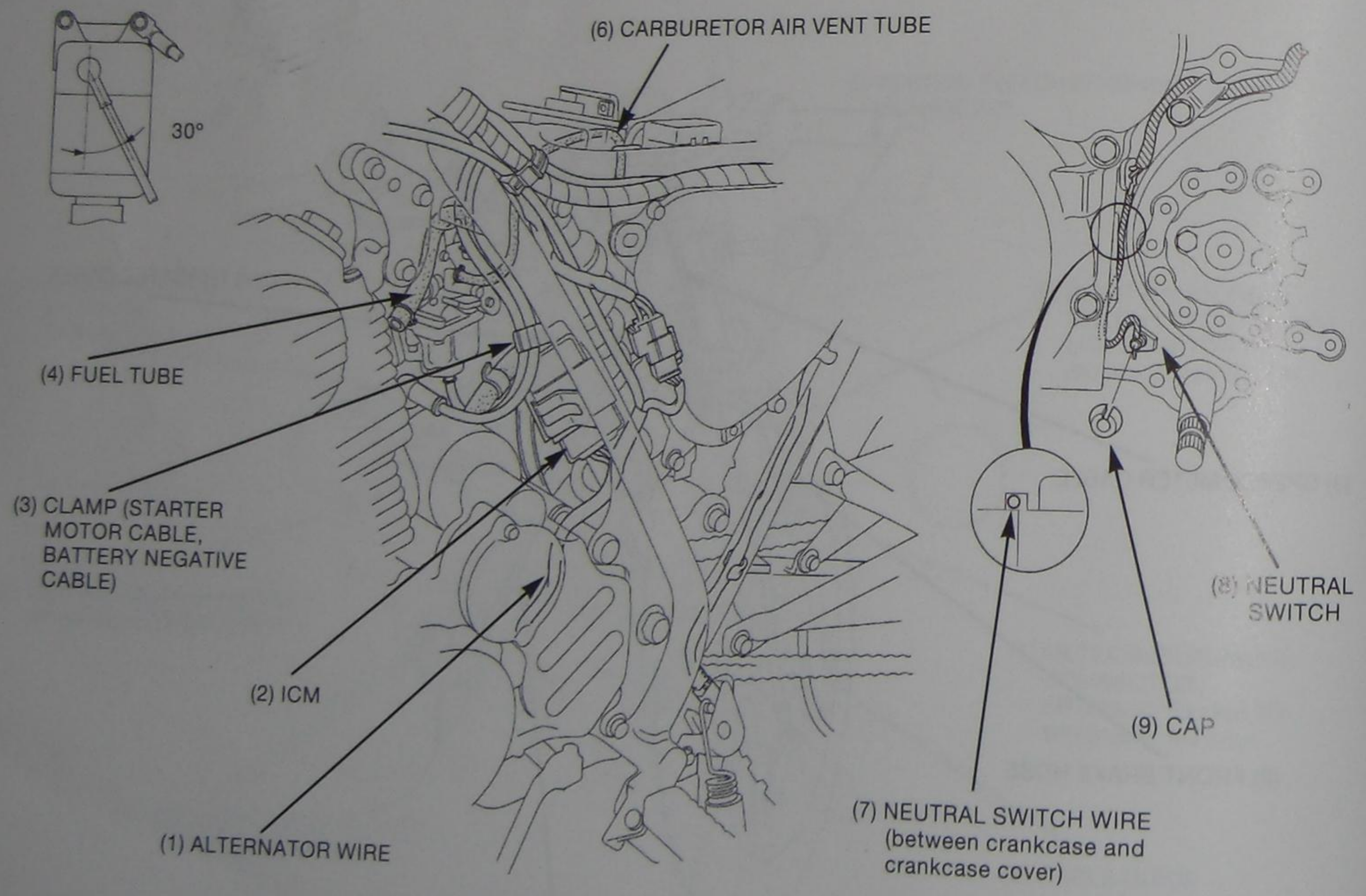

(5) THROTTLE CABLE
(6) RIGHT HANDLEBAR SWITCH WIRE
(7) CLUTCH CABLE
(8) LEFT HANDLEBAR SWITCH WIRE
(4) IGNITION SWITCH WIRE
(9) METER WIRE
(3) RIGHT TURN SIGNAL LIGHT WIRE
(10) LEFT TURN SIGNAL LIGHT WIRE
(2) FRONT BRAKE HOSE
(11) SPEEDOMETER CABLE
(1) MAIN WIRE HARNESS

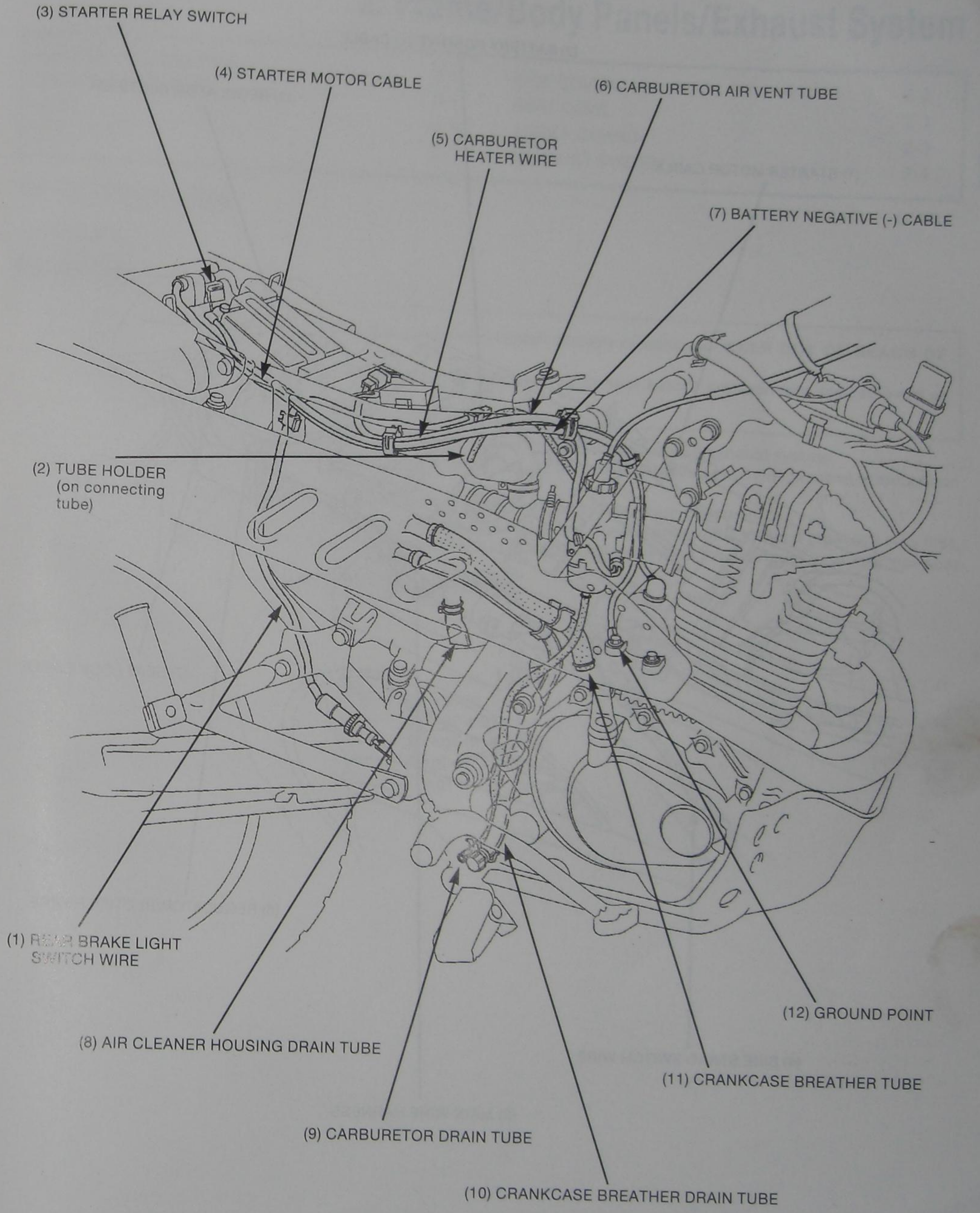

(5) IGNITION SWITCH 2P (Black) CONNECTOR
(4) TURN SIGNAL CONNECTORS
(3) CLUTCH SWITCH 2P (White) CONNECTOR
(6) RIGHT HANDLEBAR SWITCH/FRONT BRAKE LIGHT SWITCH 6P (White) CONNECTOR
(2) LEFT HANDLEBAR SWITCH 9P (White) CONNECTOR
(7) METER/INSTRUMENT CONNECTOR;
6P (Black): Except IIG
9P (Black): IIG type
(1) HEADLIGHT AND POSITION LIGHT CONNECTORS
(8) CABLE GUIDE
(9) CLAMPS

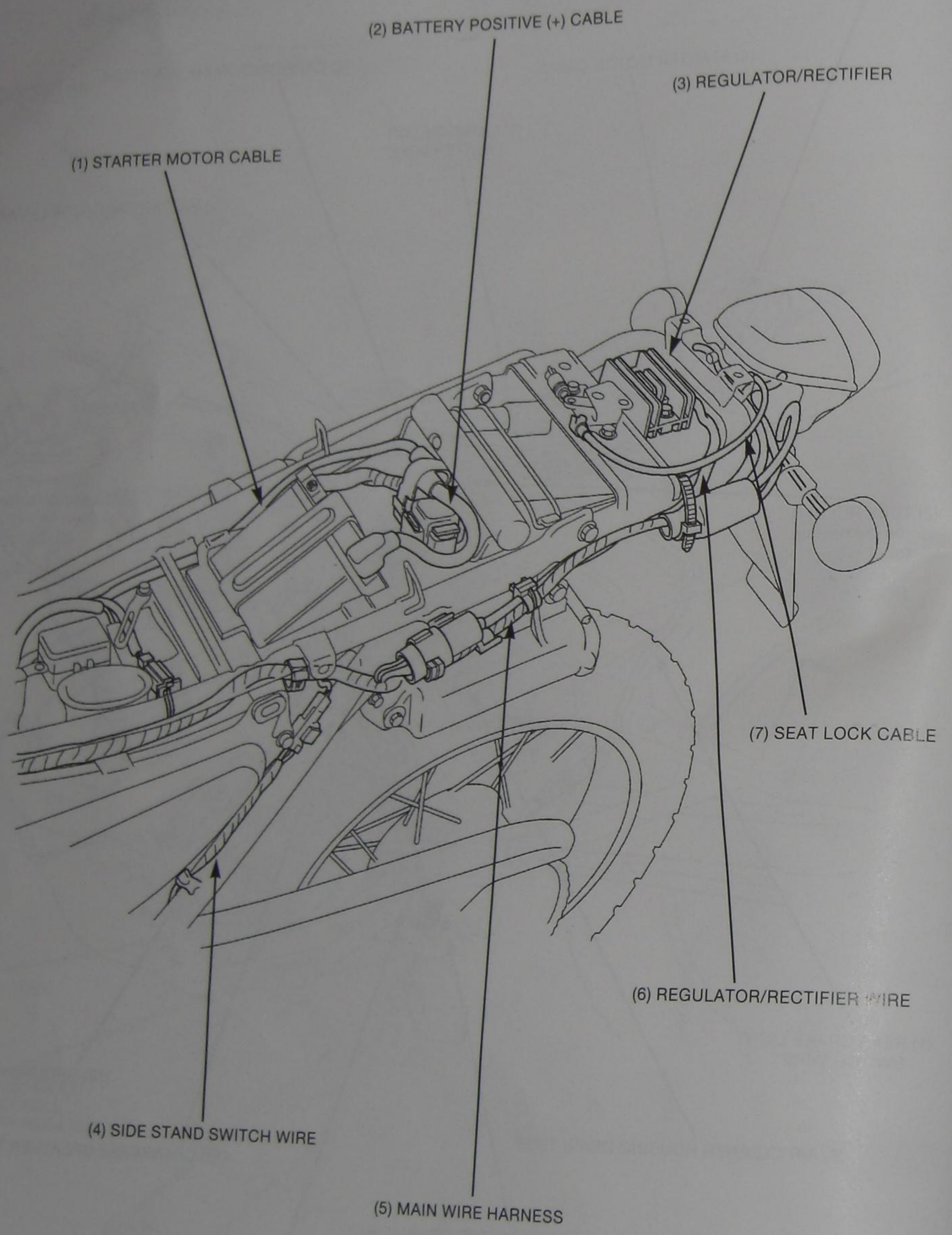

(4) TURN SIGNAL RELAY
(5) THROTTLE CABLE
(3) IGNITION COIL
(6) FRONT BRAKE HOSE
(7) SPEEDOMETER CABLE
(2) MAIN WIRE HARNESS
(1) CLUTCH CABLE


(4) THROTTLE CABLE
(3) SPEEDOMETER CABLE
(2) FRONT BRAKE HOSE
(1) CLUTCH CABLE


(1) IGNITION PULSE GENERATOR/NEUTRAL SWITCH 3P (White) CONNECTOR
(2) GROUND WIRE
(3) THROTTLE CABLE
(4) REAR BRAKE LIGHT SWITCH 2P (Black) CONNECTOR
(5) AIR TEMPERATURE SWITCH 2P (Black) CONNECTOR
(6) CARBURETOR HEATER 2P (White) CONNECTOR
(7) AIR TEMPERATURE SWITCH
(8) FUSE BOX
(9) SIDE STAND SWITCH WIRE
(10) ALTERNATOR 3P (Black) CONNECTOR
(11) IGNITION CONTROL MODULE (ICM)
(12) STARTER MOTOR CABLE


30°
(6) CARBURETOR AIR VENT TUBE
(4) FUEL TUBE
(3) CLAMP (STARTER MOTOR CABLE, BATTERY NEGATIVE CABLE)
(2) ICM
(1) ALTERNATOR WIRE
(8) NEUTRAL SWITCH
(9) CAP
(7) NEUTRAL SWITCH WIRE (between crankcase and crankcase cover)


(3) STARTER RELAY SWITCH
(4) STARTER MOTOR CABLE
(6) CARBURETOR AIR VENT TUBE
(5) CARBURETOR HEATER WIRE
(7) BATTERY NEGATIVE (-) CABLE
(2) TUBE HOLDER (on connecting tube)
(1) REAR BRAKE LIGHT SWITCH WIRE
(8) AIR CLEANER HOUSING DRAIN TUBE
(9) CARBURETOR DRAIN TUBE
(10) CRANKCASE BREATHER DRAIN TUBE
(11) CRANKCASE BREATHER TUBE
(12) GROUND POINT



# 2. Frame/Body Panels/Exhaust System

SERVICE INFORMATION 2-1
TROUBLESHOOTING 2-1
SEAT 2-2
FUEL TANK 2-2
SIDE COVER 2-3
SEAT COWL 2-3
UNDER GUARD 2-3
EXHAUST SYSTEM 2-4

## Service Information

### GENERAL

**⚠ WARNING**

- **Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.**
- **Serious burns may result if the exhaust system is not allowed to cool bejore components are removed or serviced.**

- This section covers removal and installation of the frame body panels, fuel tank and exhaust system.
- Work in a well ventilated area. Smoking or allow flames or sparks in the working area or where gasoline is stored can cause a fire or explosion.
- Always replace the exhaust pipe gasket when removing the exhaust system from the engine.
- When installing the exhaust system, loosely install all of the fasteners. Always tighten the exhaust pipe joint nuts first, then tighten the mounting fasteners. If you tighten the mounting fasteners first, the exhaust pipe may not seat properly.
- Always inspect the exhaust system for leaks after installation.

### TORQUE VALUES

| | |
|---|---|
| Exhaust pipe joint nut | 10 N·m (1.0 kgf-m, 7 lbf-ft) |
| Muffler mounting bolt | 32 N·m (3.3 kgf-m, 24 lbf-ft) |
| Muffler band bolt | 20 N·m (2.0 kgf-m, 14 lbf-ft) |
| Exhaust pipe cover bolt | 12 N·m (1.2 kgf-m, 9 lbf-ft) |
| Muffler cover screw | 4 N·m (0.4 kgf-m, 2.9 lbf-ft) |
| Fuel valve | 26N·m (2.7 kgf-m, 20 lbf-ft) |

## Troubleshooting

**Excessive exhaust noise**
- Broken exhaust system
- Exhaust gas leaks

**Poor performance**
- Deformed exhaust system
- Exhaust gas leaks
- Clogged muffler

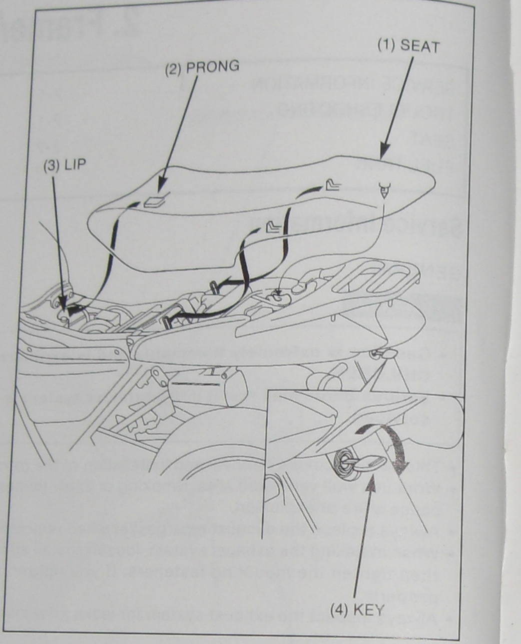
## Seat

### REMOVAL

Unhook the seat with the ignition key.
Pull the seat back and remove it.

### INSTALLATION

Install the seat, inserting the prong under the raised lip of the frame cross member.
Push the seat forward, then down to lock it.


(1) SEAT
(2) PRONG
(3) LIP
(4) KEY

## Fuel Tank

### REMOVAL/INSTALLATION

**⚠ WARNING**

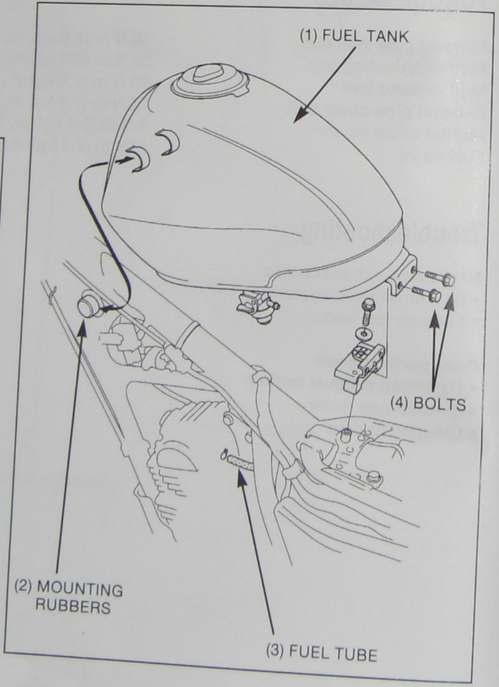
- **Gasoline is extremely flammable and is explosive under certain condition. KEEP OUT OF REACH OF CHILDREN.**

Remove the seat.

Disconnect the fuel tube from the fuel tank.
Remove the fuel tank mounting bolts.
Remove the fuel tank from the mounting rubbers.

Installation is in the reverse order of removal.

After installation, turn the fuel valve ON and check the fuel line for leakage.


(1) FUEL TANK
(4) BOLTS
(2) MOUNTING RUBBERS
(3) FUEL TUBE

## Side Cover

**CAUTION**

- **Be careful not to break the side cover bosses.**

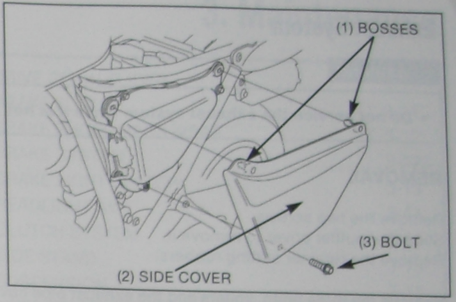
### REMOVAL/INSTALLATION

Remove the side cover bolt.
Release the side cover bosses from the grommets and remove the side cover.

Installation is in the reverse order of removal.

NOTE:

- Be careful not to dislodge the grommets in the air cleaner housing.


(1) BOSSES
(3) BOLT
(2) SIDE COVER

## Seat Cowl

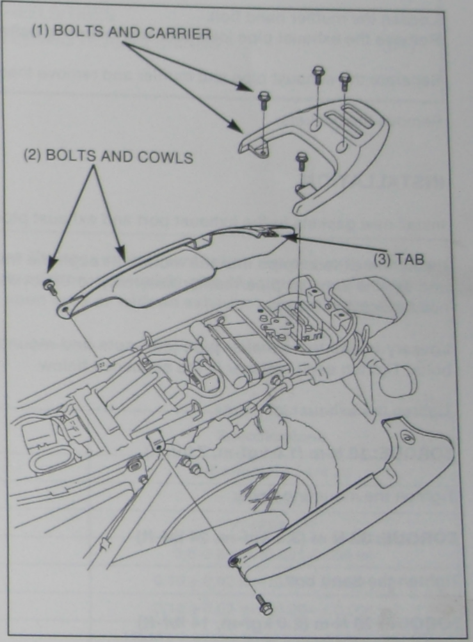
### REMOVAL/INSTALLATION

Remove the seat (page 2-2).

Remove the four bolts and the rear carrier.

Remove the two bolts.
Carefully release the tab of the right cowl to separate the cowls and remove them.

Installation is in the reverse order of removal.

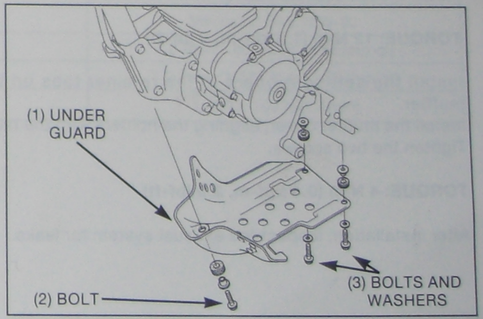

(1) BOLTS AND CARRIER
(2) BOLTS AND COWLS
(3) TAB

## Under Guard

### REMOVAL/INSTALLATION

Remove the two 6 mm bolts, washers and 8 mm bolt and the under guard.

Installation is in the reverse order of removal.


(1) UNDER GUARD
(2) BOLT
(3) BOLTS AND WASHERS

## Exhaust System

⚠ WARNING

- **Do not service the exhaust system while it is hot.**

### REMOVAL

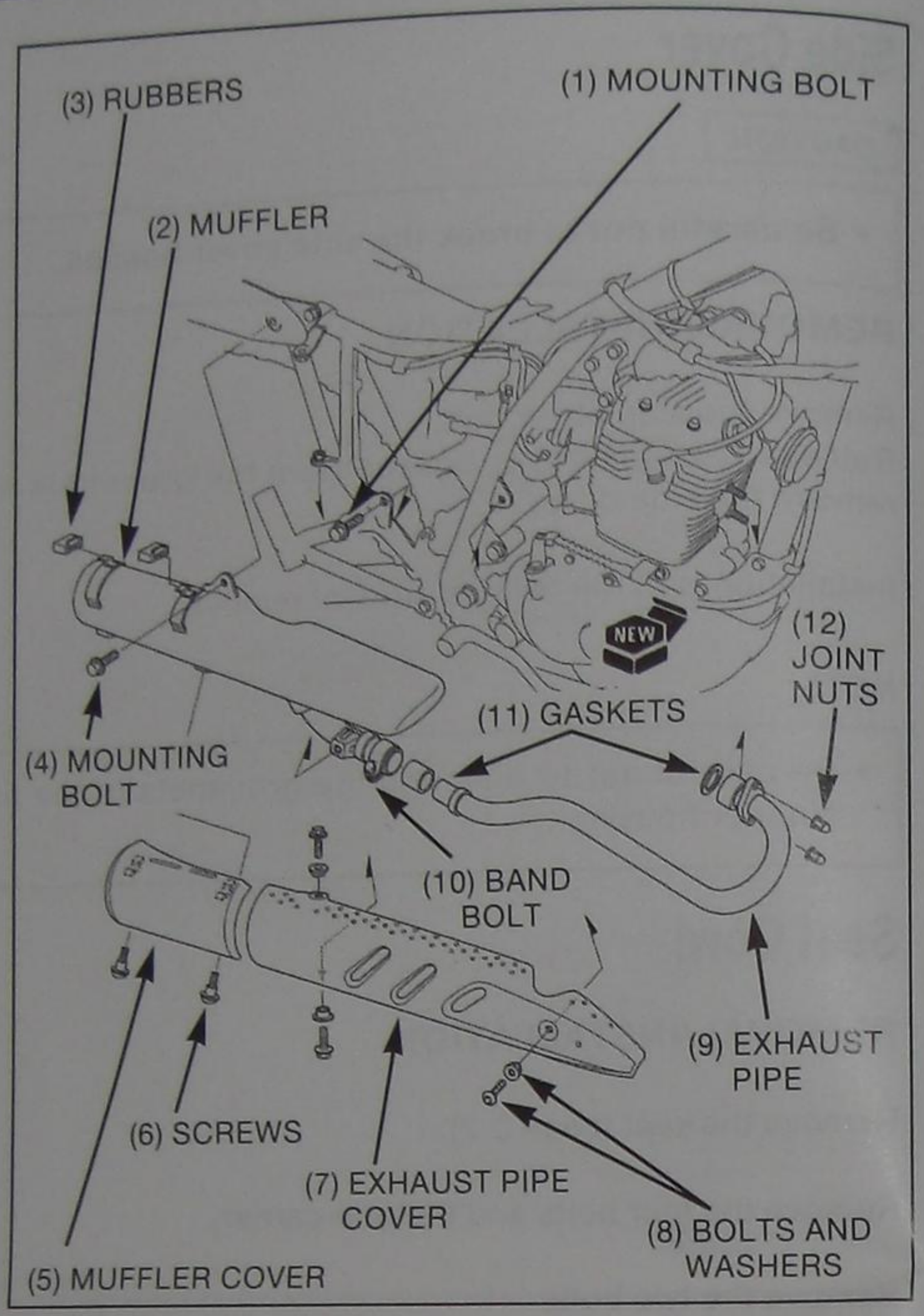
Remove the two screws.
Slide the muffler cover to remove it.
Remove the retainer setting rubbers.

Remove the three bolts, collars and the exhaust pipe cover.

Loosen the muffler band bolt.
Remove the exhaust pipe joint nuts and mounting bolts.

Separate the exhaust pipe and muffler and remove them.

Remove the gaskets.



### INSTALLATION

Install new gaskets to the exhaust port and exhaust pipe.

Install the exhaust pipe into the muffler through the frame and set the exhaust pipe/muffler assembly to the cylinder head studs and frame.

Loosely install the exhaust pipe joint nuts and mounting bolts. Tighten each fastener in the sequence below.

Tighten the exhaust joint nuts.

**TORQUE: 10 N·m (1.0 kgf-m, 7 lbf-ft)**

Tighten the mounting bolts.

**TORQUE: 32 N·m (3.3 kgf-m, 24 lbf-ft)**

Tighten the band bolt.

**TORQUE: 20 N·m (2.0 kgf-m, 14 lbf-ft)**

Install the exhaust pipe cover with the bolts and collars.

**TORQUE: 12 N·m (1.2 kgf-m, 9 lbf-ft)**

Install the setting rubbers to the retainer tabs on the muffler.
Install the muffler cover, aligning the holders with the tabs.
Tighten the two screws.

**TORQUE: 4 N·m (0.4 kgf-m, 2.9 lbf-ft)**

After installation, inspect the exhaust system for leaks.

# 3. Maintenance

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## Service Information

### GENERAL

⚠ WARNING

- **If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.**

### SPECIFICATIONS

| Item | | Specifications |
|---|---|---|
| Throttle grip free play | | 2-6 mm (1/12 - 1/4 in) |
| Spark plug | NGK | DPR8EA-9 |
| | DENSO | X24EPR-U9 |
| Spark plug gap | | 0.8-0.9 mm (0.031-0.035 in) |
| Valve clearance | Intake | 0.10 ± 0.02 mm (0.004 ± 0.001 in) |
| | Exhaust | 0.10 ± 0.02 mm (0.004 ± 0.001 in) |
| Recommended engine oil | | Honda 4-stroke oil or equivalent motor oil<br>API service classification: SE<br>Viscosity: SAE 10W-30 |
| Engine oil capacity | At draining | 1.0 liter (1.06 US qt, 0.88 Imp qt) |
| | At disassembly | 1.2 liters (1.27 US qt, 1.06 Imp qt) |
| Engine idle speed | | 1,400 ± 100 $\text{min}^{-1}$ (rpm) |

| Item | | | Specifications |
|---|---|---|---|
| Drive chain slack | | | 25-35 mm (1 — 1-3/8 in) |
| Specified brake fluid | | | DOT 4 brake fluid |
| Brake pedal free play | | | 20-30 mm (3/4-1—1/4 in) |
| Clutch lever free plays | | | 10-20 mm (3/8-3/4 in) |
| Cold tire pressure | Driver only | Front | 175 kPa (1.75 kgf/cm², 25 psi) |
| | | Rear | 175 kPa (1.75 kgf/cm², 25 psi) |
| | Driver and passenger | Front | 175 kPa (1.75 kgf/cm², 25 psi) |
| | | Rear | 200 kPa (2.00 kgf/cm², 29 psi) |
| Tire size | | Front | 90/90-19 52P |
| | | Rear | 110/90-17 60P |
| Minimum tread depth | | Front | 3.0 mm (0.12 in) |
| | | Rear | 3.0 mm (0.12 in) |

## TORQUE VALUES

| | |
|---|---|
| Spark plug | 18 N·m (1.8 kgf-m, 13 lbf-ft) |
| Valve adjusting hole cap | 15 N·m (1.5 kgf-m, 11 lbf-ft) |
| Valve adjusting lock nut | 14 N·m (1.4 kgf-m, 10 lbf-ft) |
| Crankshaft hole cap | 8 N·m (0.8 kgf-m, 5.8 lbf-ft) |
| Timing hole cap | 10 N·m (1.0 kgf-m, 7 lbf-ft) |
| Oil strainer screen cap | 15 N·m (1.5 kgf-m, 11 lbf-ft) |
| Air cleaner housing cover screw | 1 N·m (0.1 kgf-m, 0.7 lbf-ft) |
| Rear axle nut | 88 N·m (9.0 kgf-m, 65 lbf-ft) U-nut |
| Master cylinder reservoir cap screw | 2 N·m (0.2 kgf-m, 1.4 lbf-ft) |
| Headlight case mounting bolt | 22 N·m (2.2 kgf-m, 16 lbf-ft) |
| Front spoke nipple | 4 N·m (0.4 kgf-m, 2.9 lbf-ft) |
| Rear spoke nipple | 4 N·m (0.4 kgf-m, 2.9 lbf-ft) |

## TOOLS

| | |
|---|---|
| Valve adjusting wrench, 8 x 9 mm | 07708-0030100 |
| Valve adjusting screw | 07980-GE00100 |
| Spoke wrench, 5.8 x 6.1 mm | 07701-0020300 |

## Maintenance Schedule

Perform the Pre-ride inspection in the Owner's Manual at each scheduled maintenance period.
I: Inspect and Clean, Adjust, Lubricate or Replace if necessary.
C: Clean
R: Replace
A: Adjust
L: Lubricate.
The following items require some mechanical knowledge. Certain items (particularly those marked * and **) may require more technical information and tools. Consult your Honda dealer.

| | ITEM / FREQUENCY | WHICHEVER COMES FIRST → NOTE ↓ | ODOMETER READING [(NOTE (1)] | | | | | Refer to page |
|---|---|---|---|---|---|---|---|---|
| | | | X 1,000 km | 1 | 4 | 8 | 12 | |
| | | | X 1,000 mi | 0.6 | 2.5 | 5 | 7.5 | |
| | | | MONTHS | | 6 | 12 | 18 | |
| * | FUEL LINE | | | | I | I | I | 3-4 |
| * | FUEL STRAINER SCREEN | | | | C | C | C | 3-4 |
| * | THROTTLE OPERATION | | | | I | I | I | 3-4 |
| | AIR CLEANER | NOTE 2 | | | | | R | 3-5 |
| | CRANKCASE BREATHER | NOTE 3 | | | C | C | C | 3-6 |
| | SPARK PLUG | | | | I | R | I | 3-6 |
| * | VALVE CLEARANCE | | | I | I | I | I | 3-6 |
| | ENGINE OIL | | | R | Every 1,250 km (2,000 mi) R | | | 3-8 |
| * | ENGINE OIL STRAINER SCREEN | | | | | | C | 3-9 |
| ** | ENGINE OIL CENTRIFUGAL FILTER | | | | | | C | 4-2 |
| * | ENGINE IDLE SPEED | | | I | I | I | I | 3-9 |
| | DRIVE CHAIN | NOTE 4 | | Every 1,000 km (600 mi) I,L | | | | 3-10 |
| | DRIVE CHAIN SLIDER | | | | I | I | I | 3-11 |
| | BRAKE FLUID | NOTE 5 | | | I | I | I | 3-11 |
| | BRAKE SHOES/PADS WEAR | | | | I | I | I | 3-12 |
| | BRAKE SYSTEM | | | I | I | I | I | 3-12 |
| * | BRAKE LIGHT SWITCH | | | | I | I | I | 3-13 |
| * | HEADLIGHT AIM | | | | I | I | I | 3-14 |
| | CLUTCH SYSTEM | | | I | I | I | I | 3-14 |
| | SIDE STAND | | | | I | I | I | 3-15 |
| * | SUSPENSION | | | | I | I | I | 3-15 |
| * | NUTS, BOLTS, FASTENERS | NOTE 4 | | I | | I | | 3-16 |
| ** | WHEELS/TIRES | NOTE 4 | | I | I | I | I | 3-16 |
| ** | STEERING HEAD BEARINGS | | | I | | | I | 3-17 |

* Should be serviced by your Honda dealer, unless the owner has proper tools and service data is mechanically qualified.
** In the interest of safety, we recommend these items be serviced only by your Honda dealer.

Honda recommends that your Honda dealer should road test your motorcycle after each periodic maintenance is carried out.

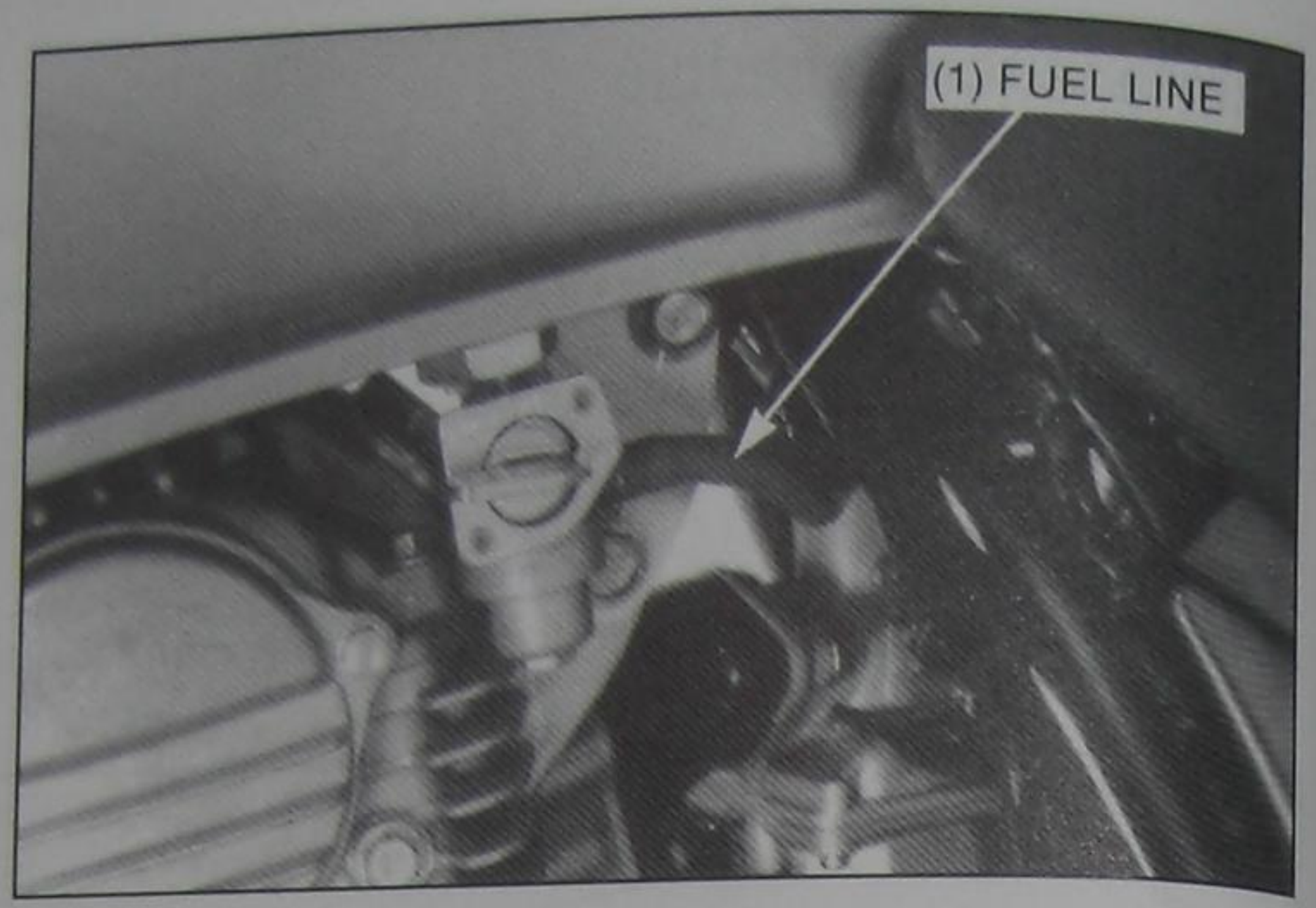
NOTES:
1. At higher odometer reading, repeat at the frequency interval established here.
2. Service more frequently when riding in unusually wet or dusty areas.
3. Service more frequently when riding in rain or at full throttle.
4. Service more frequently when riding OFF-ROAD.
5. Replace every 2 years. Replacement requires mechanical skill.

## Fuel Line

Check the fuel line for deterioration, damage or leakage. Replace the fuel line if necessary.

Also check the fuel line clip for loose or improperly positioned.

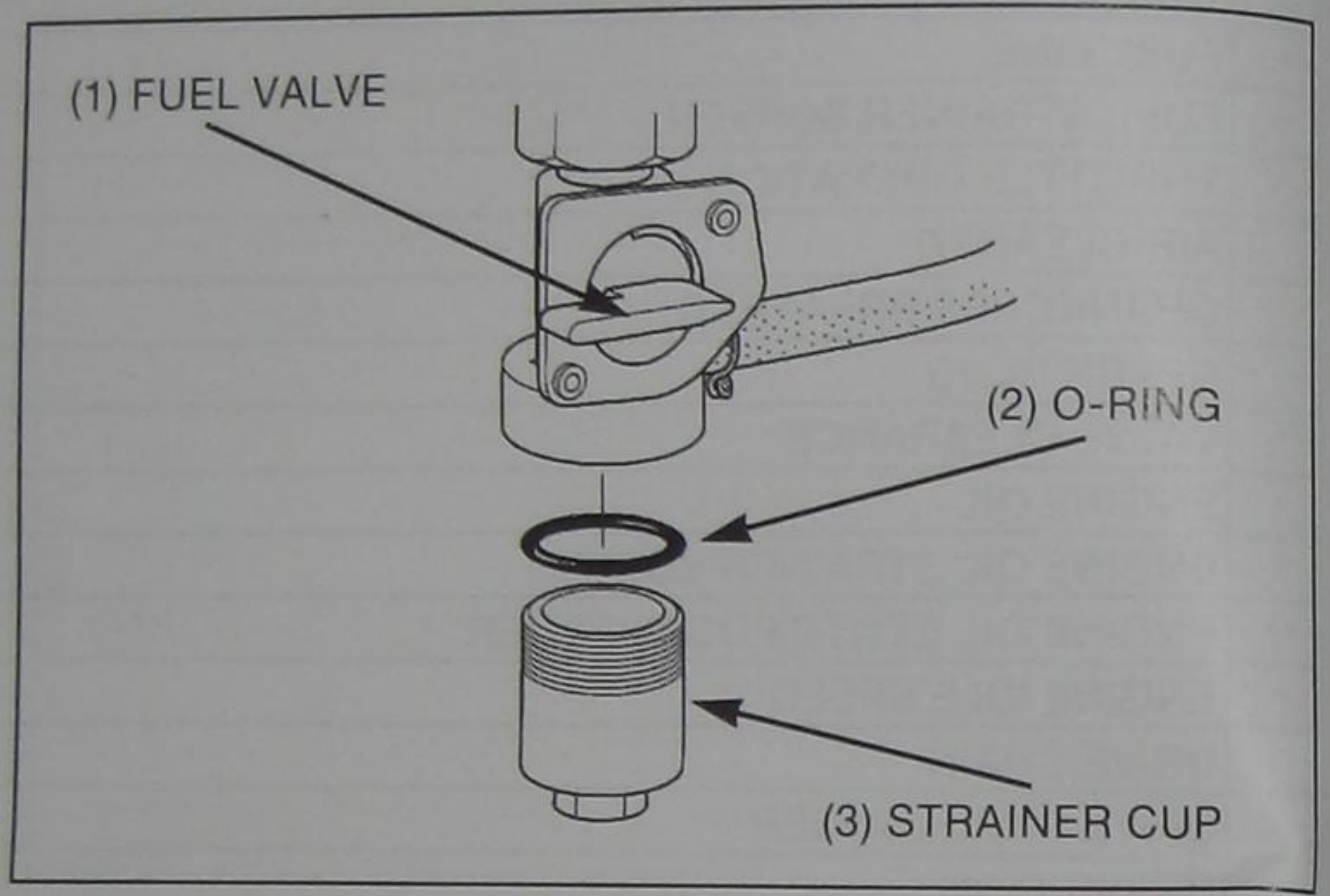
Replace any defective parts.



## Fuel Strainer Screen

**⚠ WARNING**

- **Gasoline is extremely flammable and is explosive under certain condition. KEEP OUT OF REACH OF CHILDREN.**



Turn the fuel valve OFF.
Remove the fuel strainer cup and O-ring, and pour the contents of the cup into a suitable container.
Wash the cup in clean non-flammable or high flash point solvent.
Check that the O-ring is in good condition and replace it with a new one if necessary.
Reinstall the O-ring and fuel strainer cup in the fuel valve body, making sure that the O-ring is in place.
Hand-tighten the fuel strainer cup and then tighten it with a wrench.

NOTE:

- Do not overtighten the fuel strainer cup.

After installing, turn the fuel valve ON and check that there are no fuel leaks.

## Throttle Operation

Check for any deterioration or damage to the throttle cable. Check that the throttle grip for smooth operation. Check that the throttle opens and automatically closes in all steering positions.

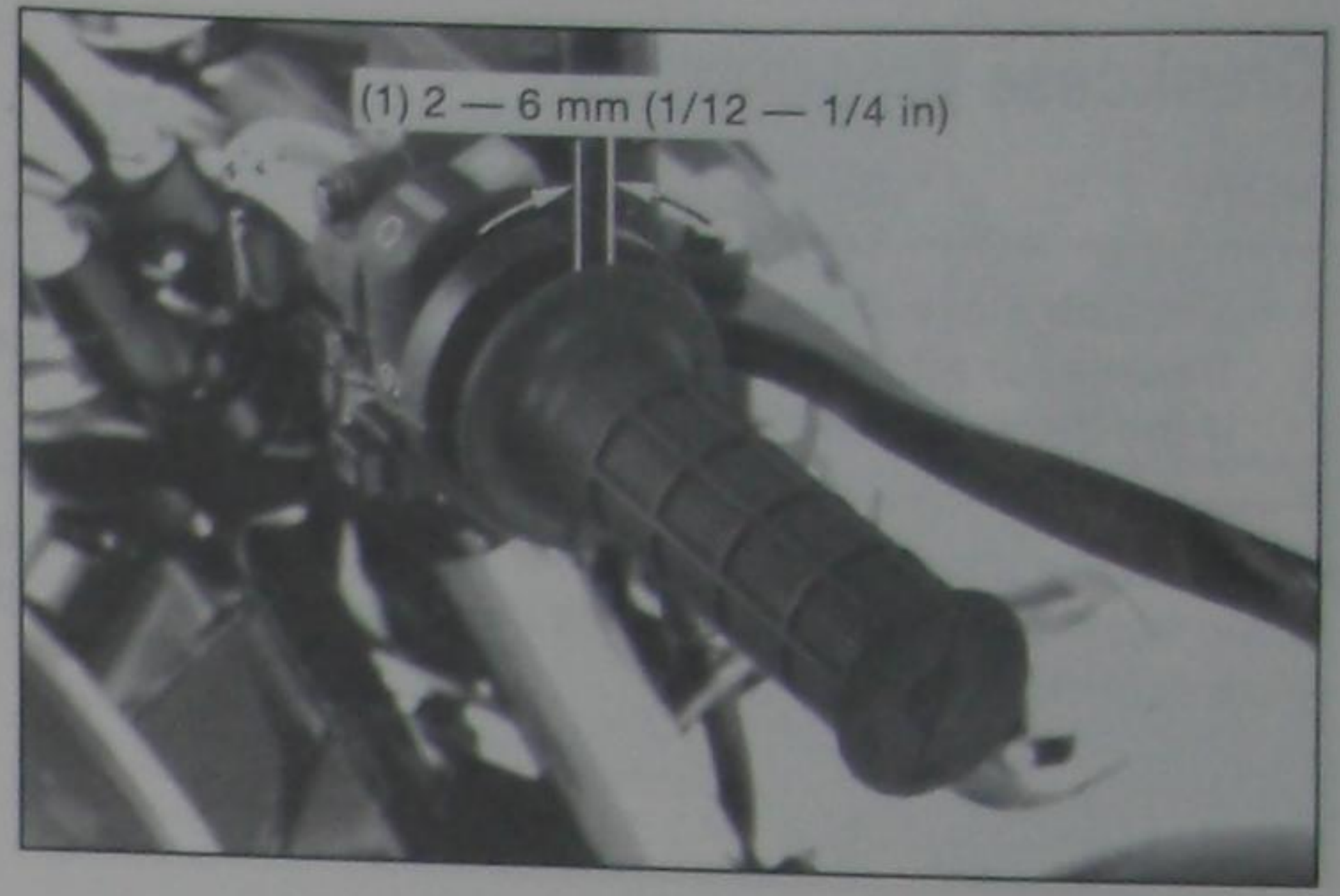
If the throttle grip does not return properly, lubricate the throttle cable and overhaul and lubricate the throttle housing.
For cable lubrication: Disconnect the throttle cable at its upper end. Thoroughly lubricate the cable and its pivot point with a commercially available cable lubricant or a light weight oil.

If the throttle grip still does not return properly, replace the throttle cable.

---

**⚠ WARNING**

- **Reusing a damaged or abnormally bent or kinked throttle cable can prevent proper throttle slide operation and may lead to a loss of throttle control while riding.**



With the engine idling, turn the handlebar all the way to the right and left to ensure that the idle speed does not change. If idle speed increases, check the throttle grip free play and the throttle cable connection.

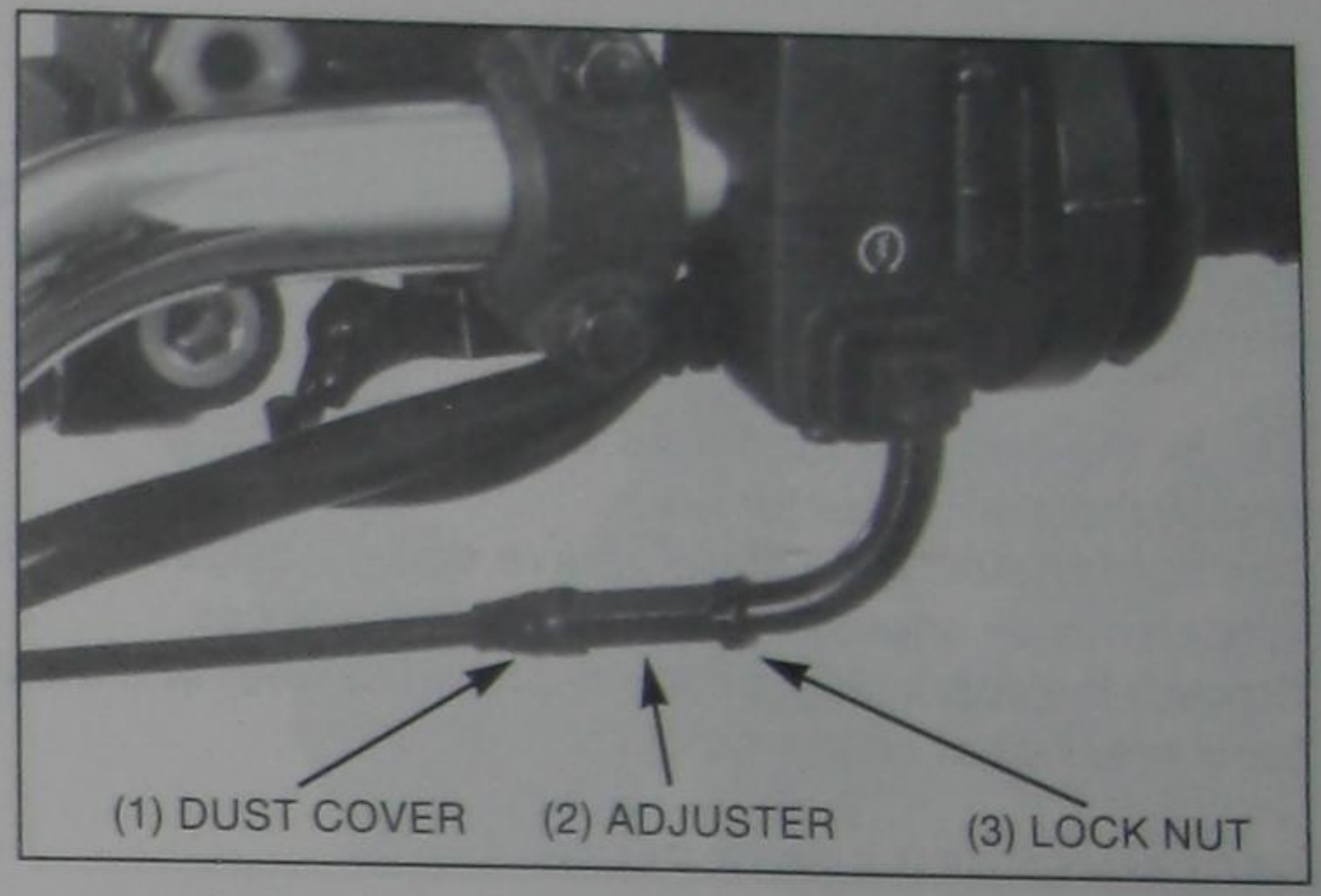
Measure the throttle grip free play at the throttle grip flange.

**THROTTLE GRIP FREE PLAY: 2 — 6 mm (1/12 — 1/4 in)**

Throttle grip free play can be adjusted using the adjuster at the throttle housing.
Slide the dust cover off the adjuster, loosen the lock nut and turn the adjuster as required.

After adjustment, tighten the lock nut and reposition the dust cover.

Recheck the throttle operation in all steering positions.



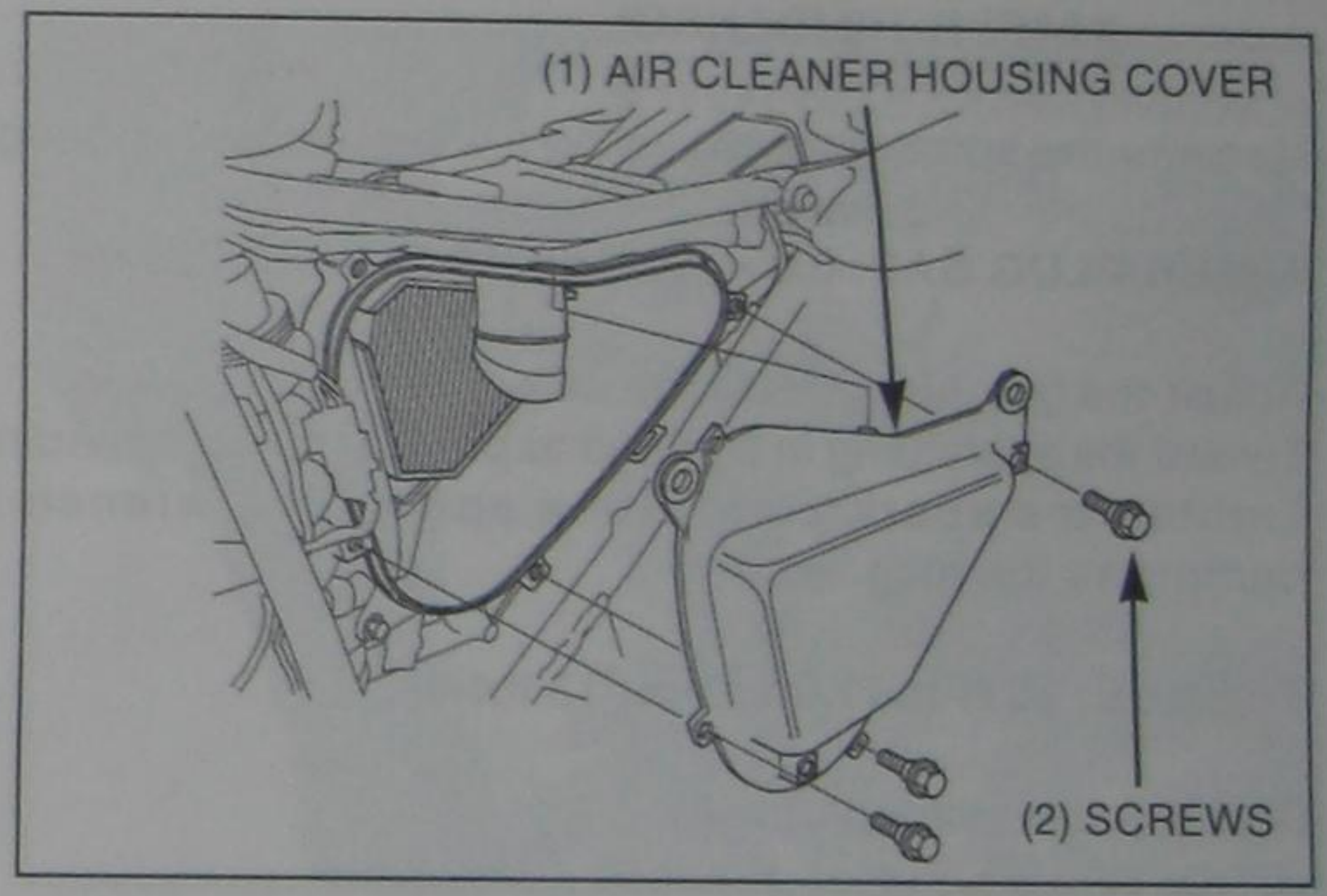
## Air Cleaner

NOTE:

- The viscous paper element type air cleaner cannot be cleaned because the element contains a dust adhesive.
- If the motorcycle is used in wet or dusty areas, more frequent inspections are required.

Remove the left side cover (page 2-3)

Remove the four screws and the air cleaner housing cover.

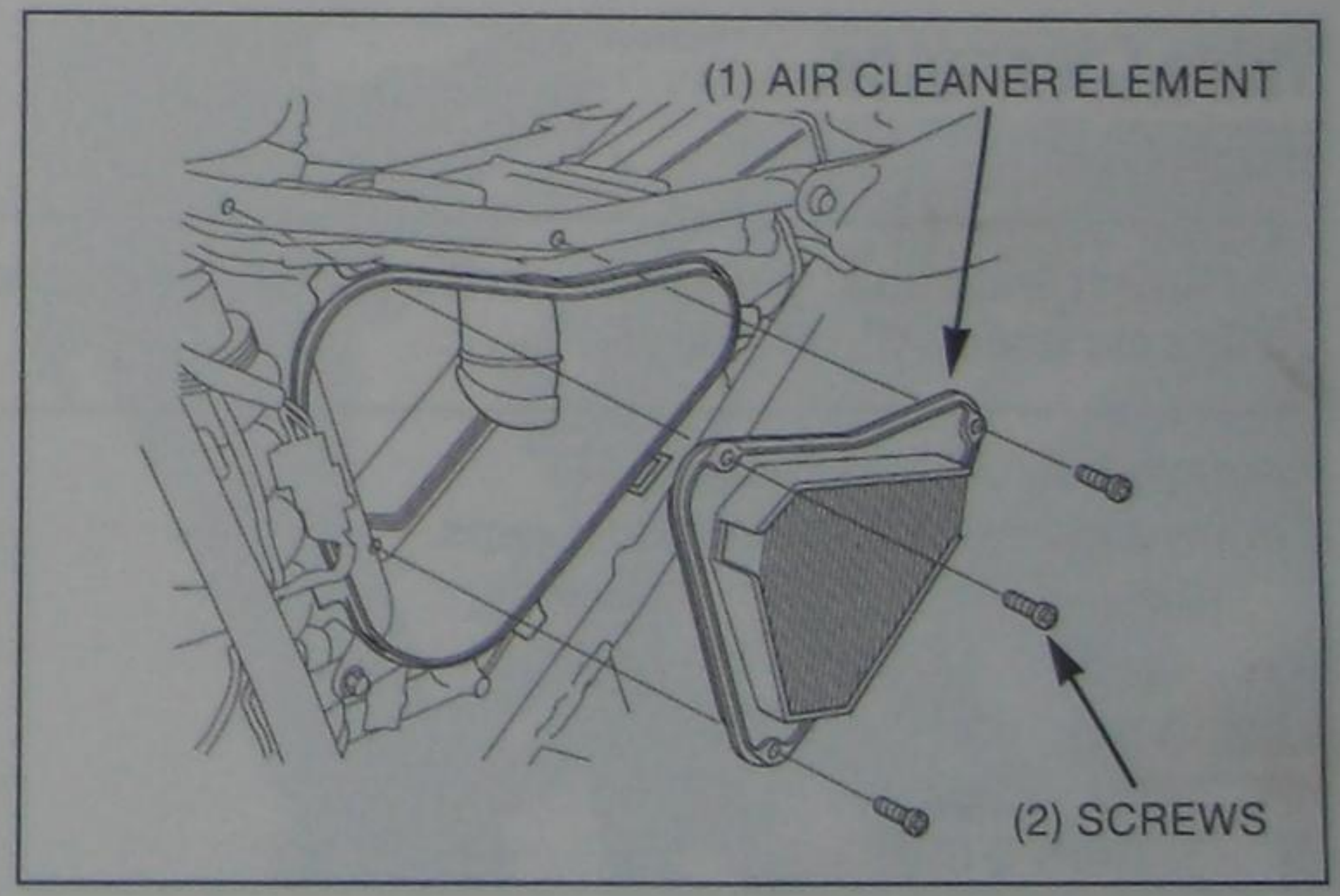


Remove the three screws and the air cleaner element from the air cleaner housing.

Remove the element in accordance with the maintenance schedule or any time it is excessively dirty or damaged.

Install the removed parts in the reverse order of removal.

**TORQUE:**
**Housing cover screws: 1 N·m (0.7 kgf-m, 0.7 lbf-ft)**

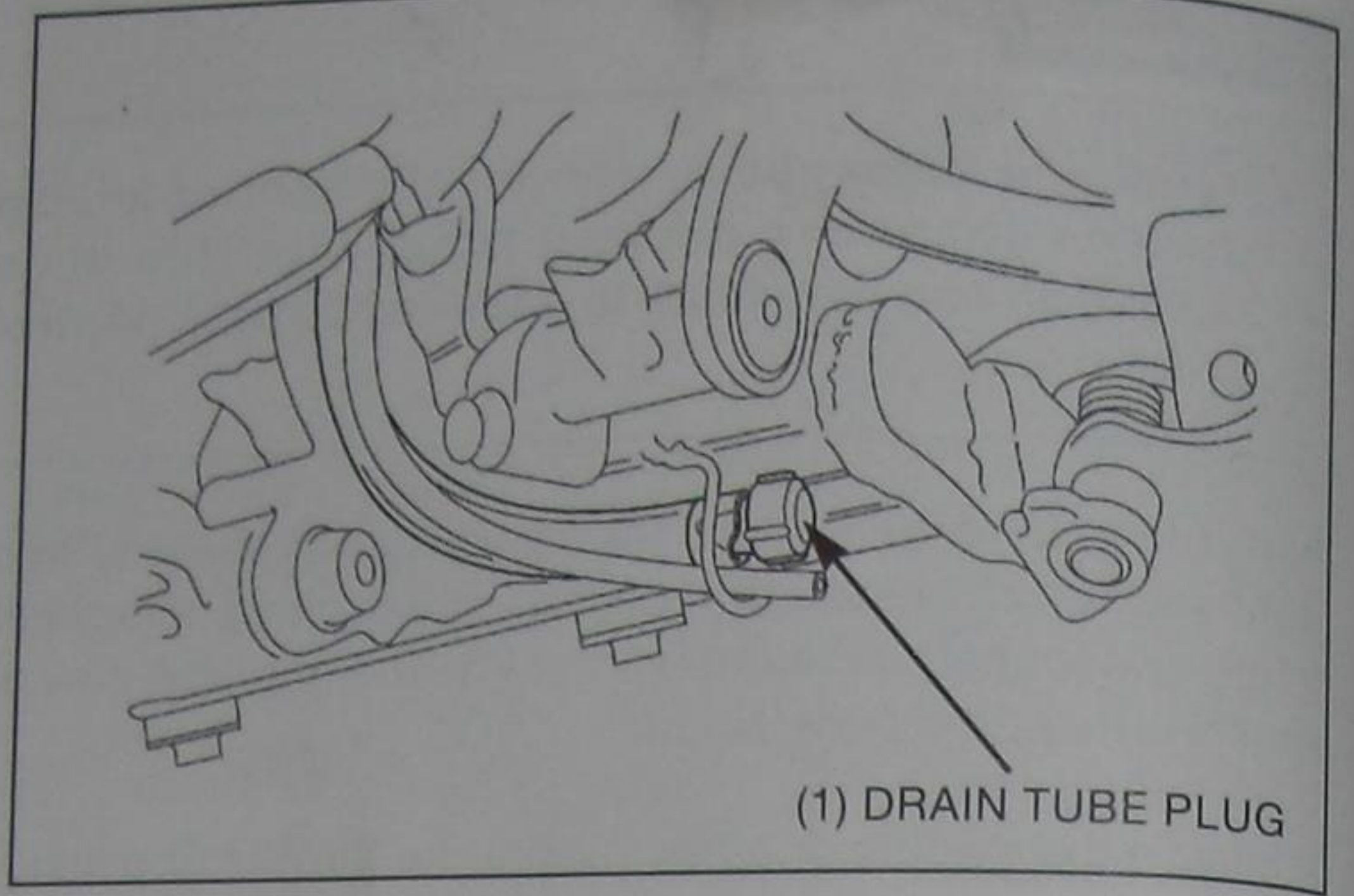


## Crankcase Breather

NOTE:

- Service more frequently when ridden in rain, at full throttle, or after the motorcycle is overturned. Service if the deposits level can be seen in the drain tube.

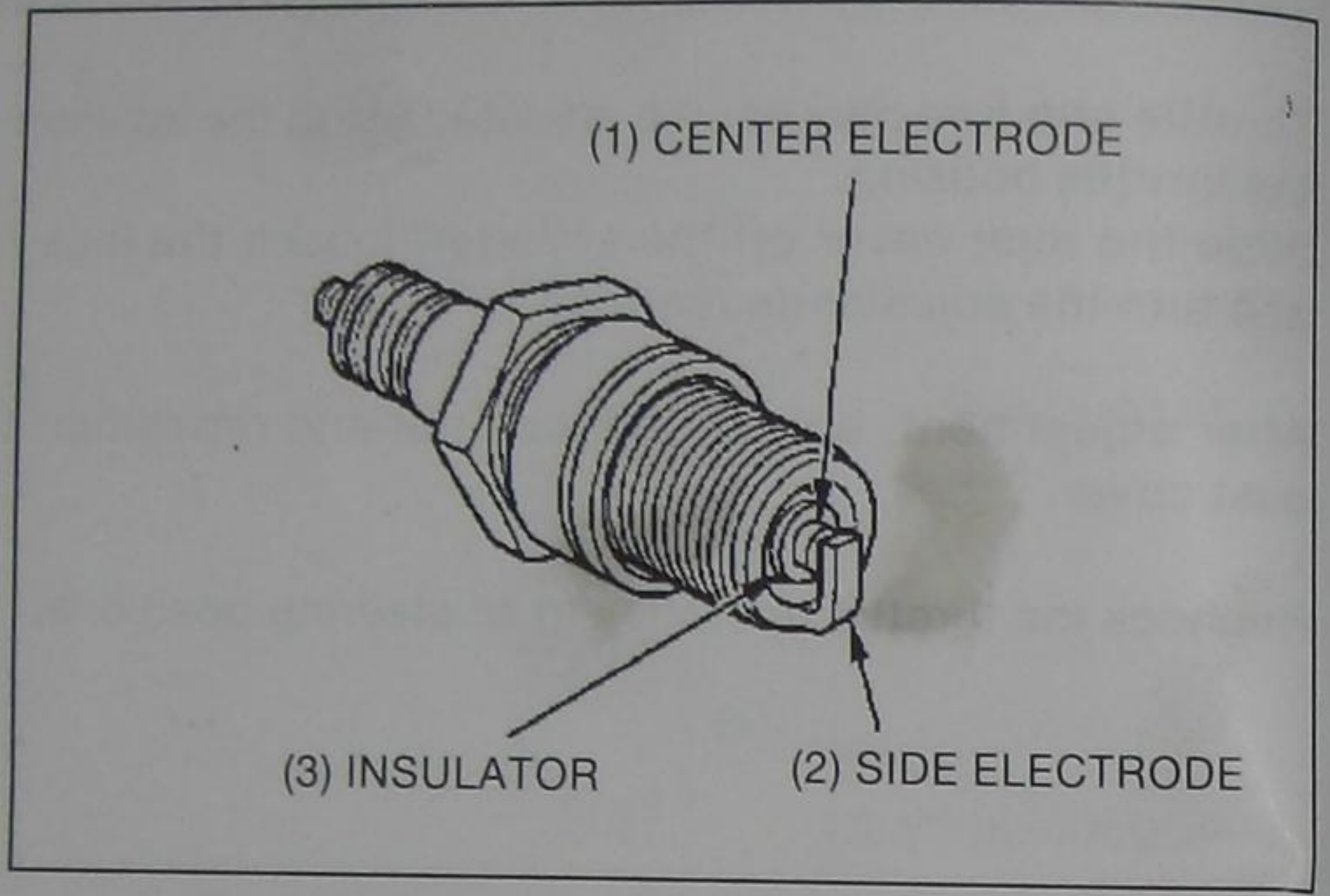
Remove the plug from the breather tank drain tube end and drain the deposits into a suitable container, then install the plug securely.



## Spark Plug

Disconnect the spark plug cap and clean around the spark plug base with compressed air.
Remove the spark plug.

Check the insulator for cracks or damage.
Check the electrodes for wear.
The center electrode should have square edges and the side electrode should have a constant thickness.
Discard the spark plug if there is apparent wear or if insulator is cracked or chipped.



**RECOMMENDED SPARK PLUG:**
**DPR8EA-9 (NGK)**
**X24EPR-U9 (DENSO)**

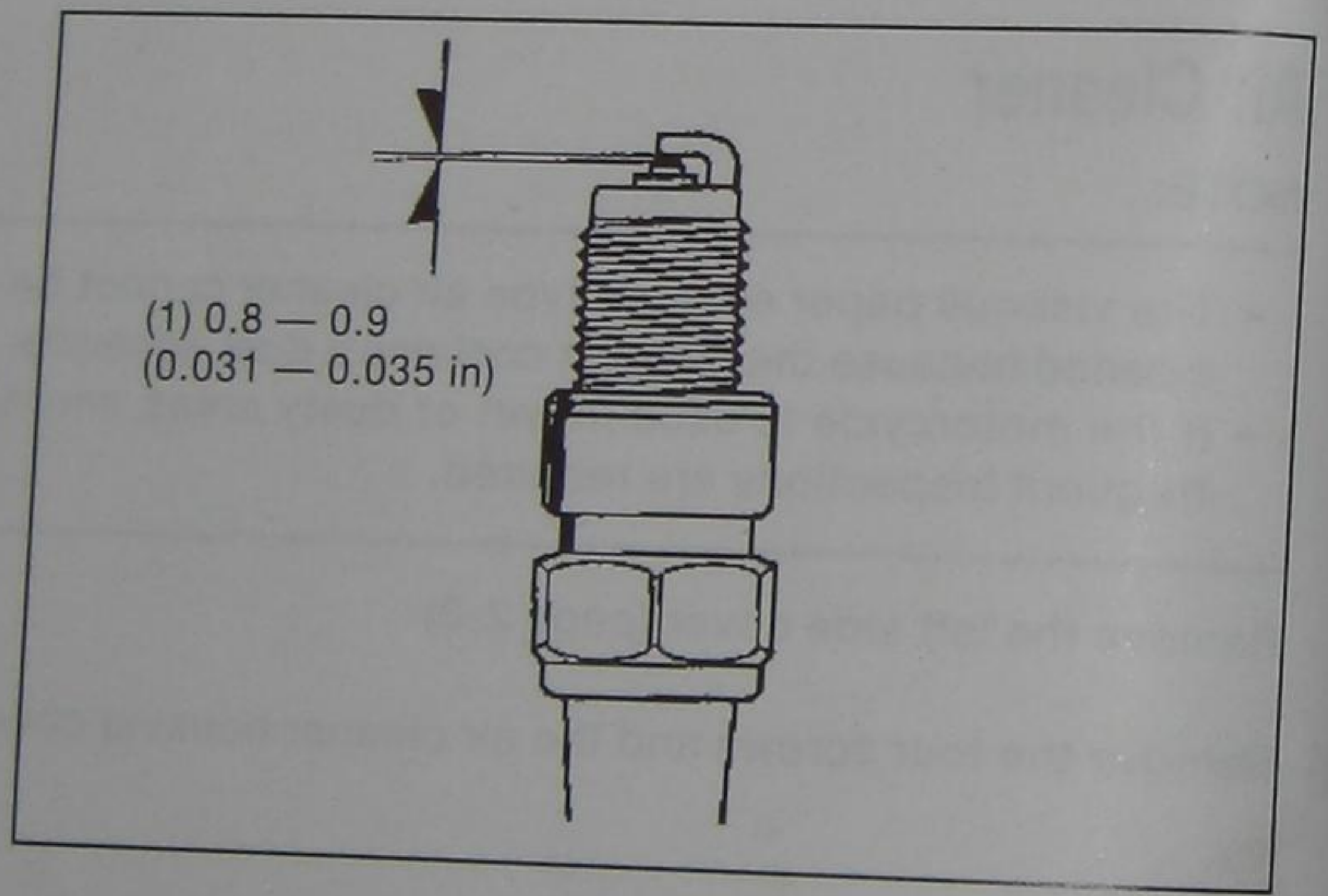
Measure the spark plug gap using a wire-type feeler gauge.

**SPARK PLUG GAP: 0.8 — 0.9 mm (0.031 — 0.035 in)**

Adjust the gap by bending the side electrode carefully.
Thread the spark plug in by hand to prevent cross-threading.
Tighten the spark plug with a spark plug wrench to compress the plug washer.

**TORQUE: 18 N·m (1.8 kgf-m, 13 lbf-ft)**

Connect the spark plug cap.

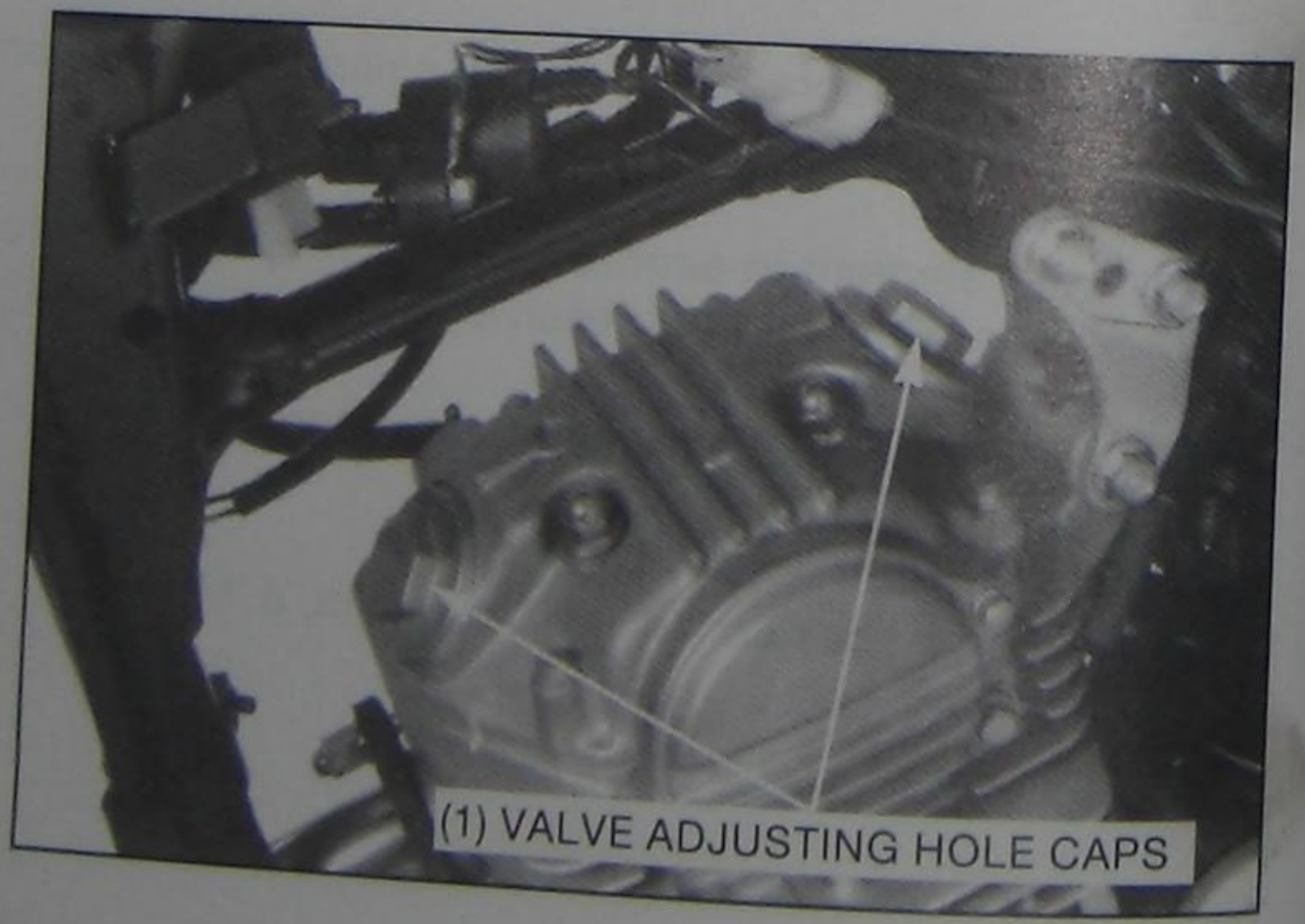


## Valve Clearance

NOTE:

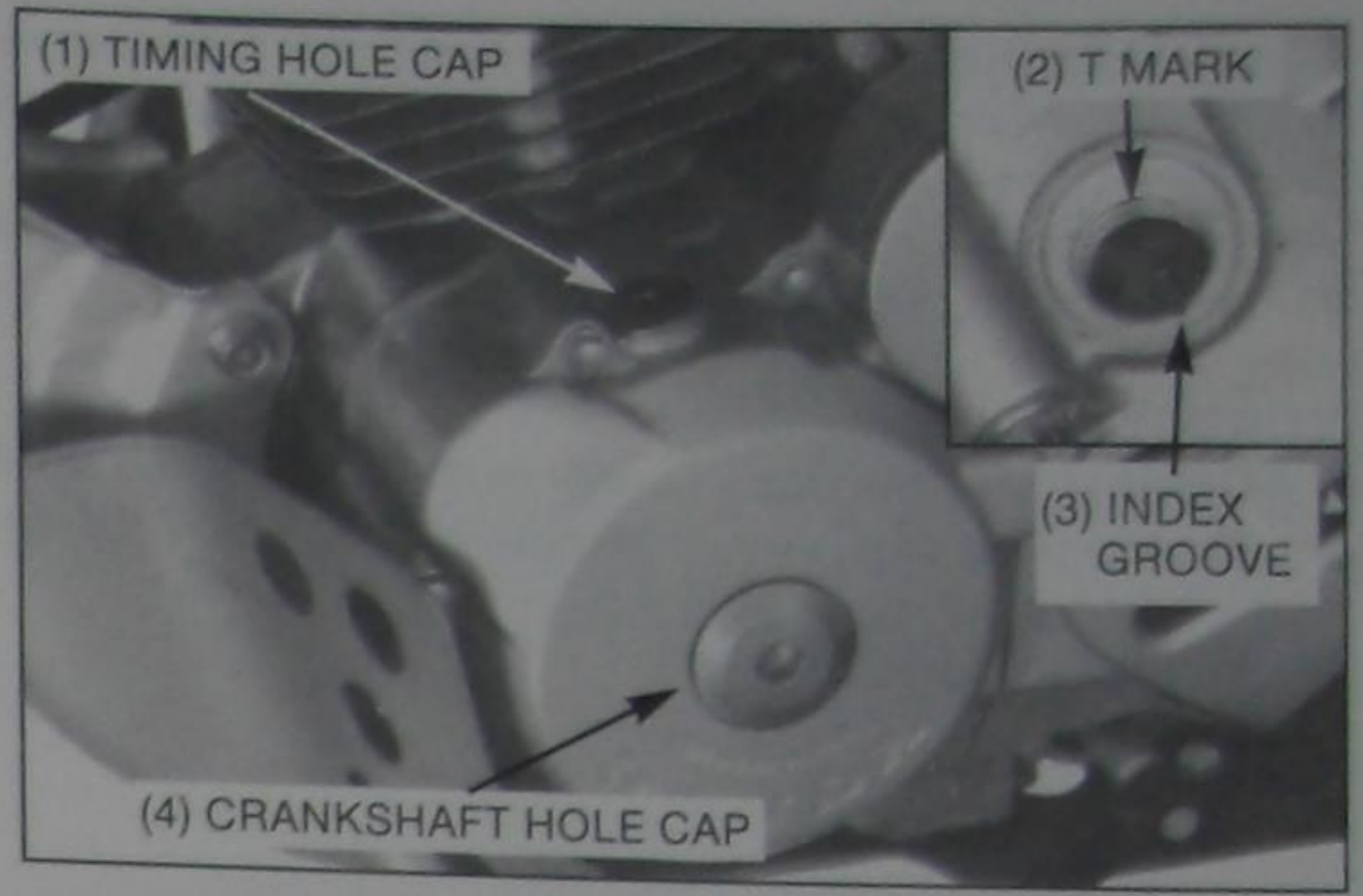
- Inspect and adjust the valve clearance when the engine is cold (below 35° C / 95° F).

Remove the fuel tank (page 2-2)
Remove the valve adjusting hole caps.



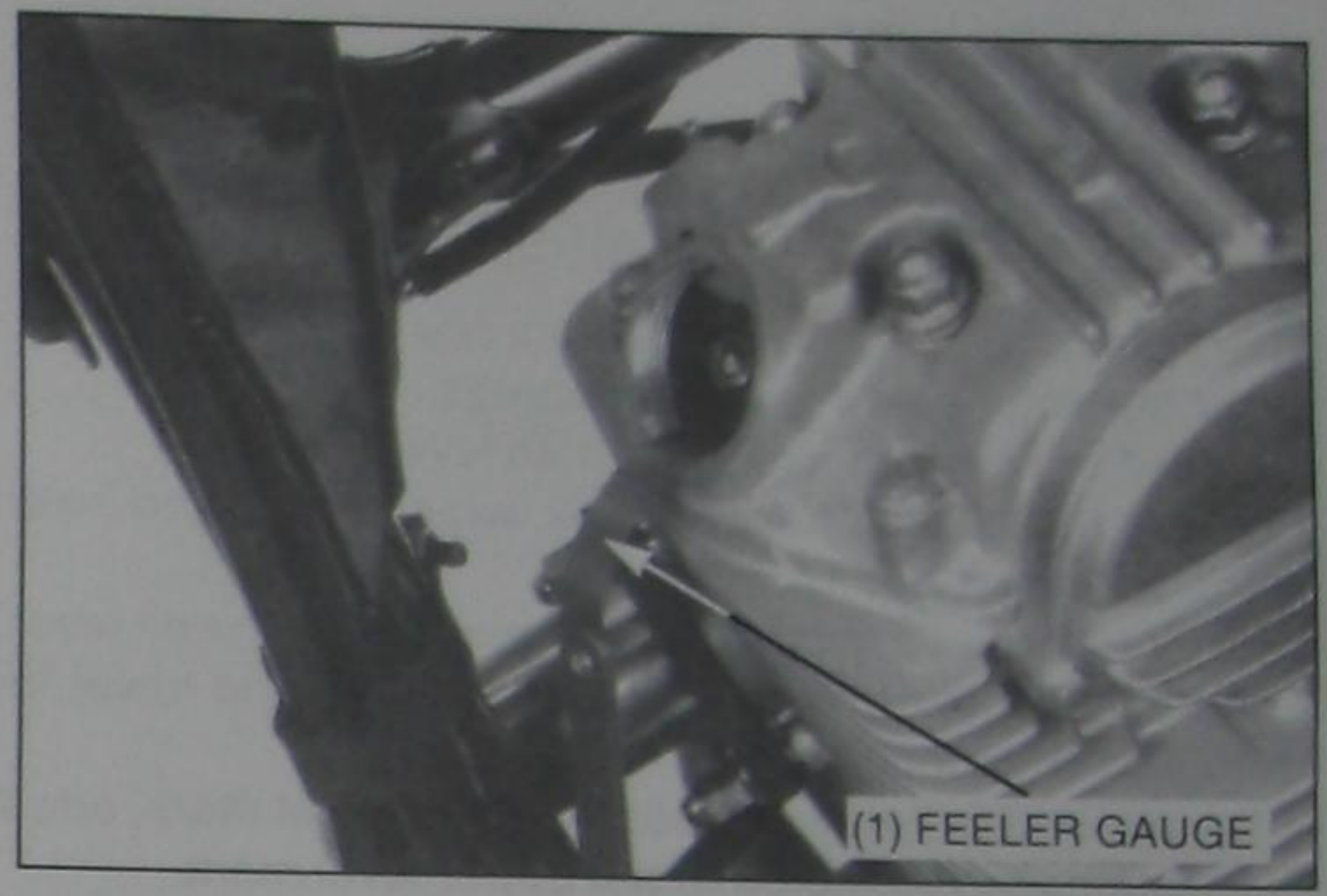
Remove the crankshaft hole cap and timing hole cap.

Rotate the crankshaft counterclockwise and align the T mark on the flywheel with the index groove in the left crankcase cover.
Make sure that the piston is at TDC (Top Dead Center) on the compression stroke. (The rocker arms should be loose.)
If the rocker arms are tight, rotate the crankshaft counterclockwise 360° (1 full turn) and realign the T mark with the index groove.



Check the valve clearance by inserting the feeler gauge between the valve adjusting screw and the valve stem.

**VALVE CLEARANCE:**
**Intake: 0.10 ± 0.02 mm (0.004 ± 0.001 in)**
**Exhaust: 0.10 ± 0.02 mm (0.004 ± 0.001 in)**



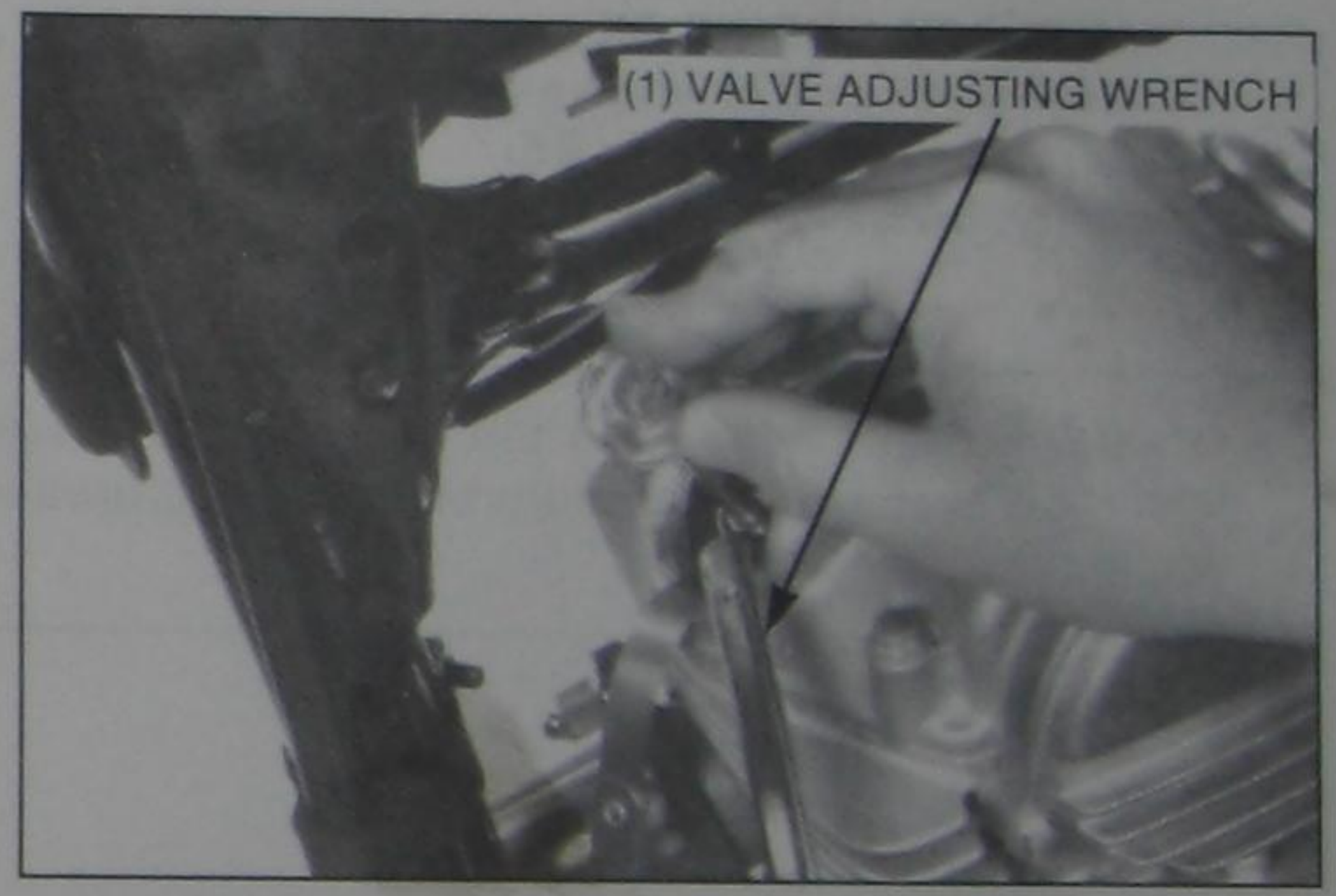
Adjust the valve clearance by loosening the lock nut and turning the adjusting screw until there is slight drag on the feeler gauge.
Hold the adjusting screw and tighten the lock nut.

**TORQUE: 14 N·m (1.4 kgf-m, 10 lbf-ft)**

**TOOLS:**

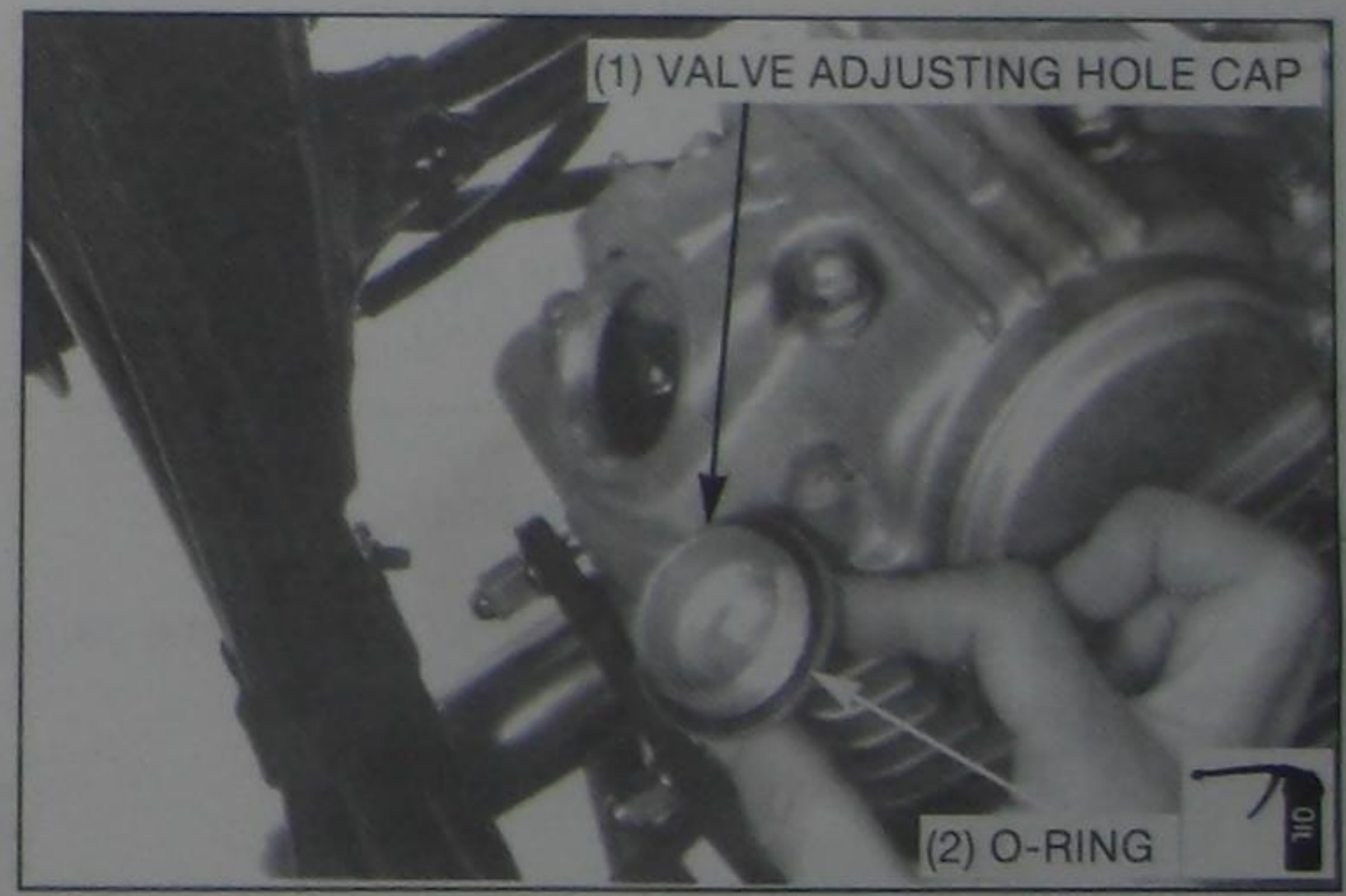
| | |
|---|---|
| **Valve adjusting wrench, 8 x 9 mm** | **07708-0030100** |
| **Valve adjusting screw** | **07980-GE00100** |

Recheck the valve clearances.

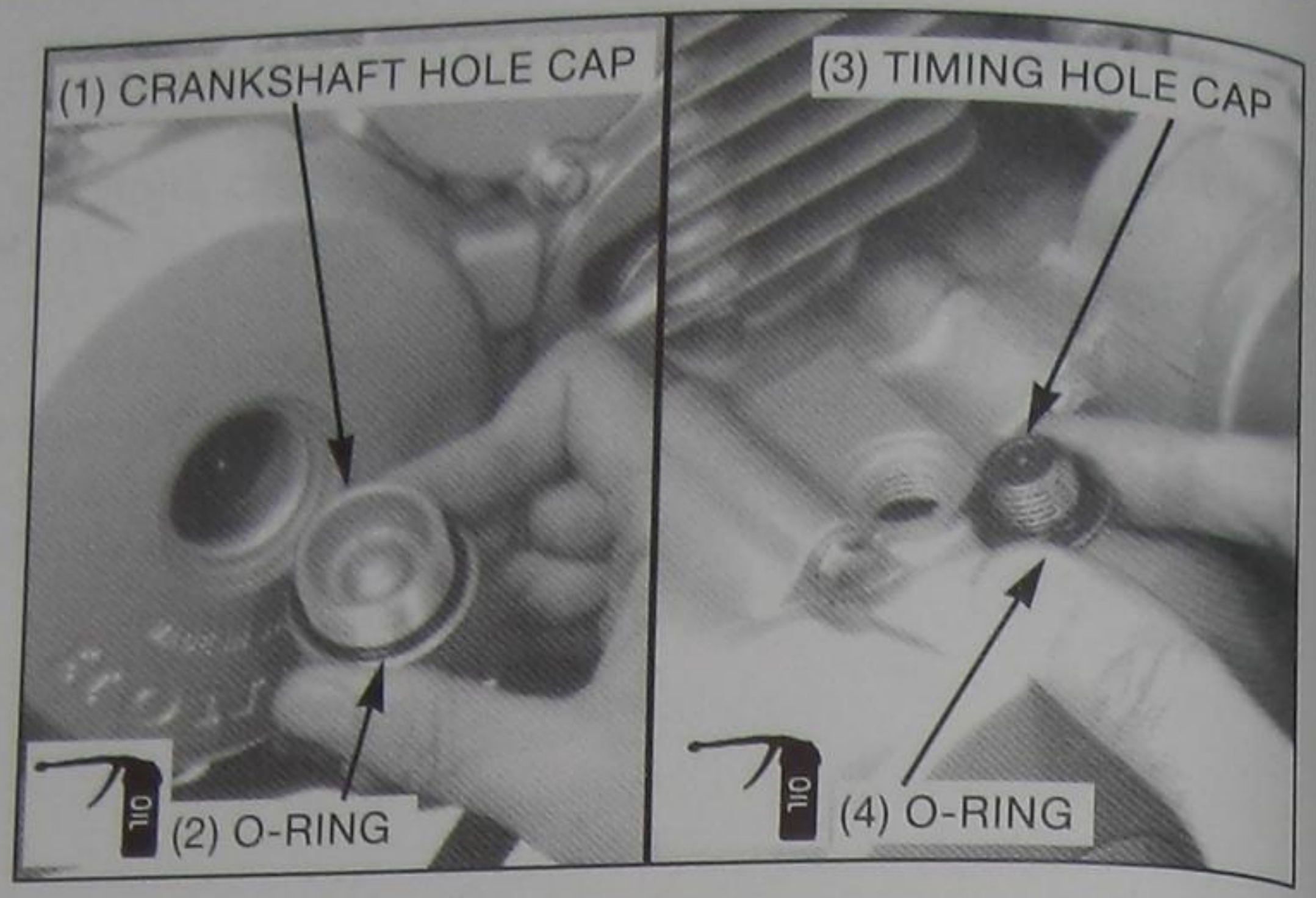


Check that the O-rings on the valve adjusting hole caps are in good condition and replace them with new ones if necessary. Apply oil to the O-rings, install the valve adjusting hole caps and tighten them.

**TORQUE: 15 N·m (1.5 kgf-m, 11 lbf-ft)**



Check that the O-rings on the crankshaft hole cap and timing hole cap are in good condition and replace them with new ones if necessary.
Apply oil to the O-rings, install the crankshaft hole cap and timing hole cap, and tighten them.



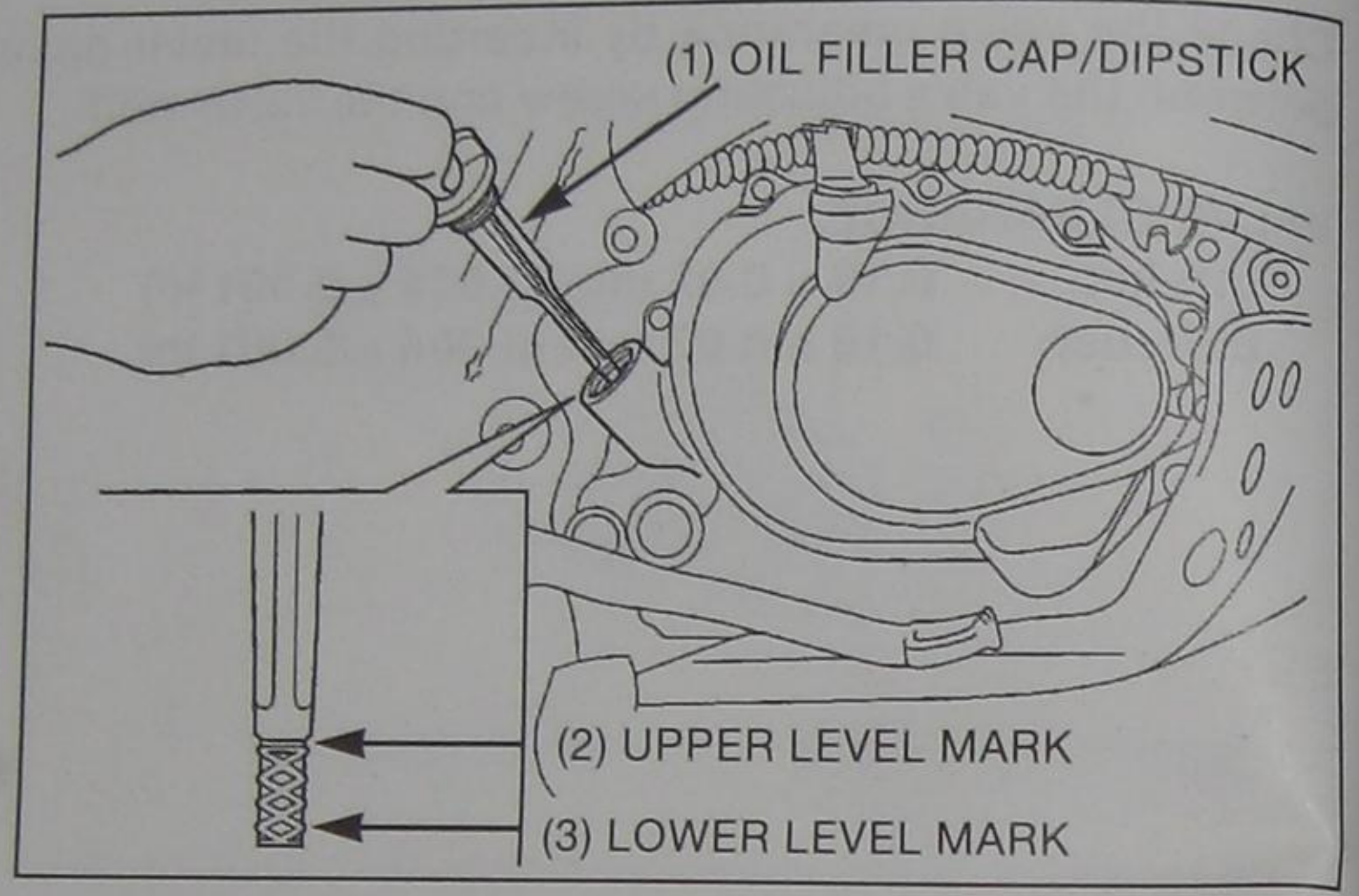
**TORQUE:**

**Crankshaft hole cap:** **8 N·m (0.8 kgf-m, 5.8 lbf-ft)**
**Timing hole cap:** **10 N·m (1.0 kgf-m, 7 lbf-ft)**

Install the fuel tank (page 2-2)

## Engine Oil

### OIL LEVEL CHECK

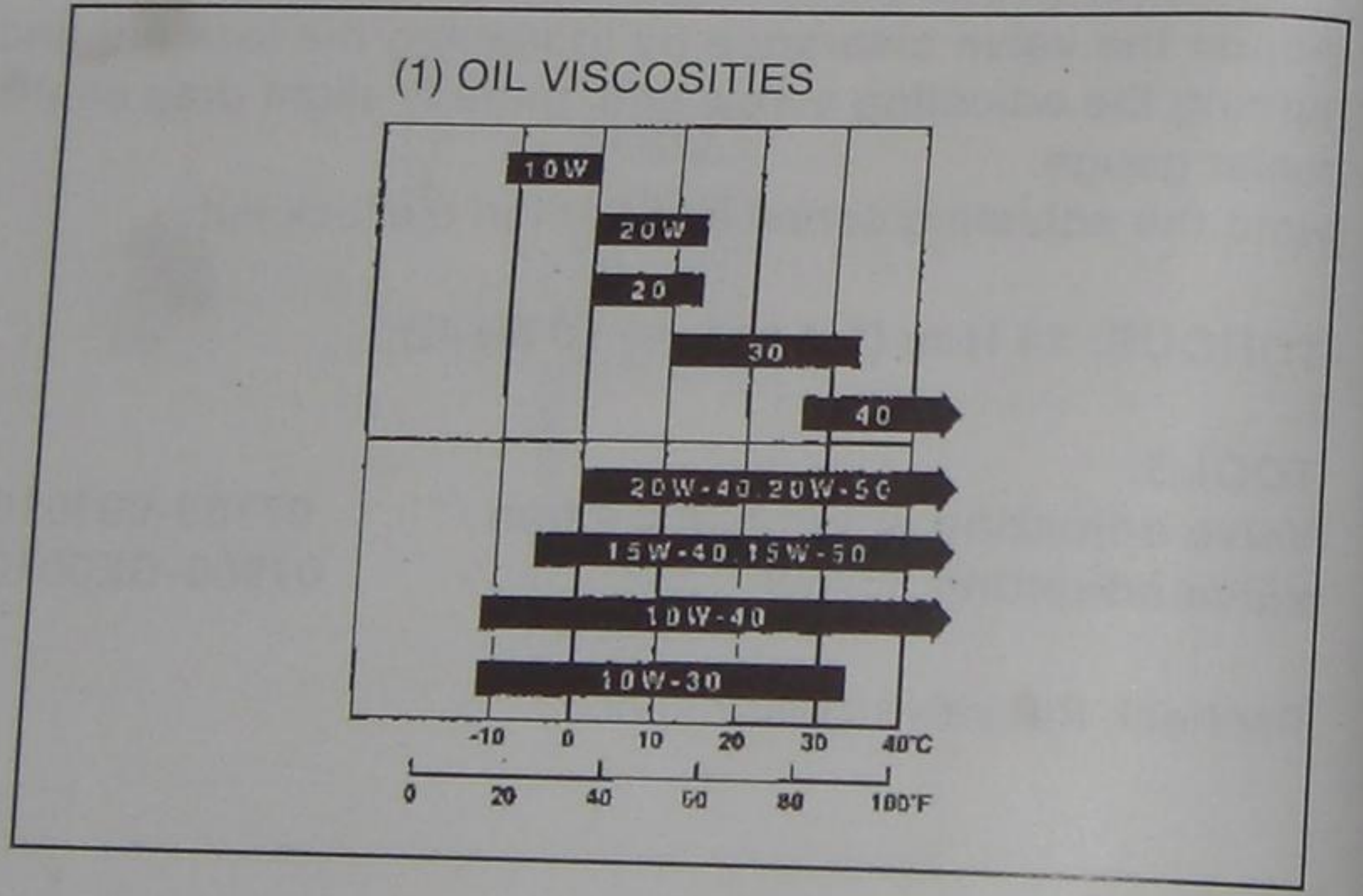


Start the engine and let it idle for a few minutes.
Stop the engine and wait 2-3 minutes.
Support the motorcycle upright on level ground.
Remove the oil filler cap/dipstick, wipe it clean and insert it without screwing it in.
Remove the oil filler cap/dipstick and check the oil lever.
The oil level should be between the upper and lower level marks on the dipstick.
If the oil level is below or near the lower level mark, add the recommended engine oil to the upper level mark.

**RECOMMENDED ENGINE OIL:**
**Honda 4-stroke oil or equivalent motor oil**
**API service classification: SE**
**Viscosity: SAE 10W-30**

NOTE:

- Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range.



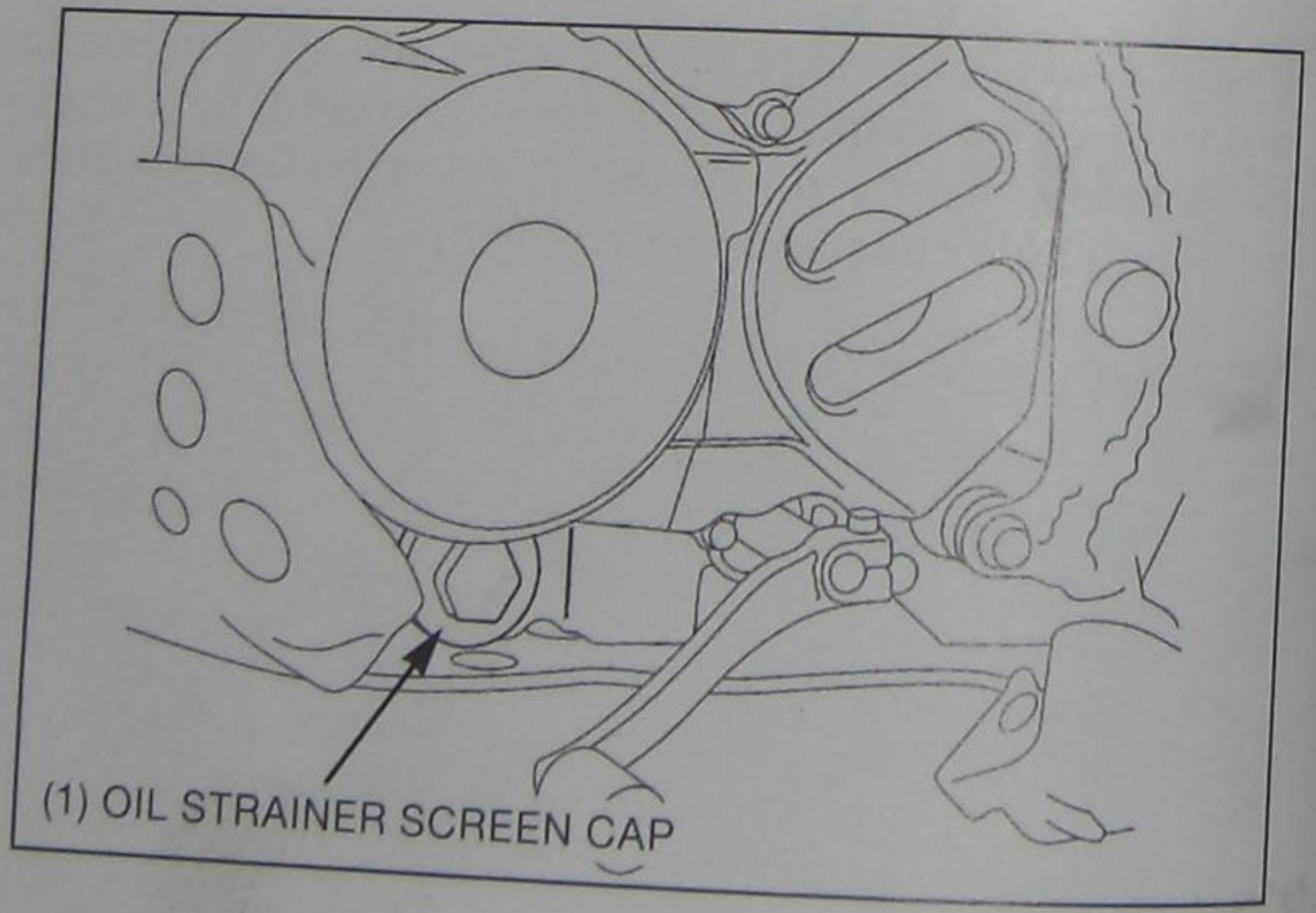
Reinstall the filler cap/dipstick.

### OIL CHANGE

NOTE:

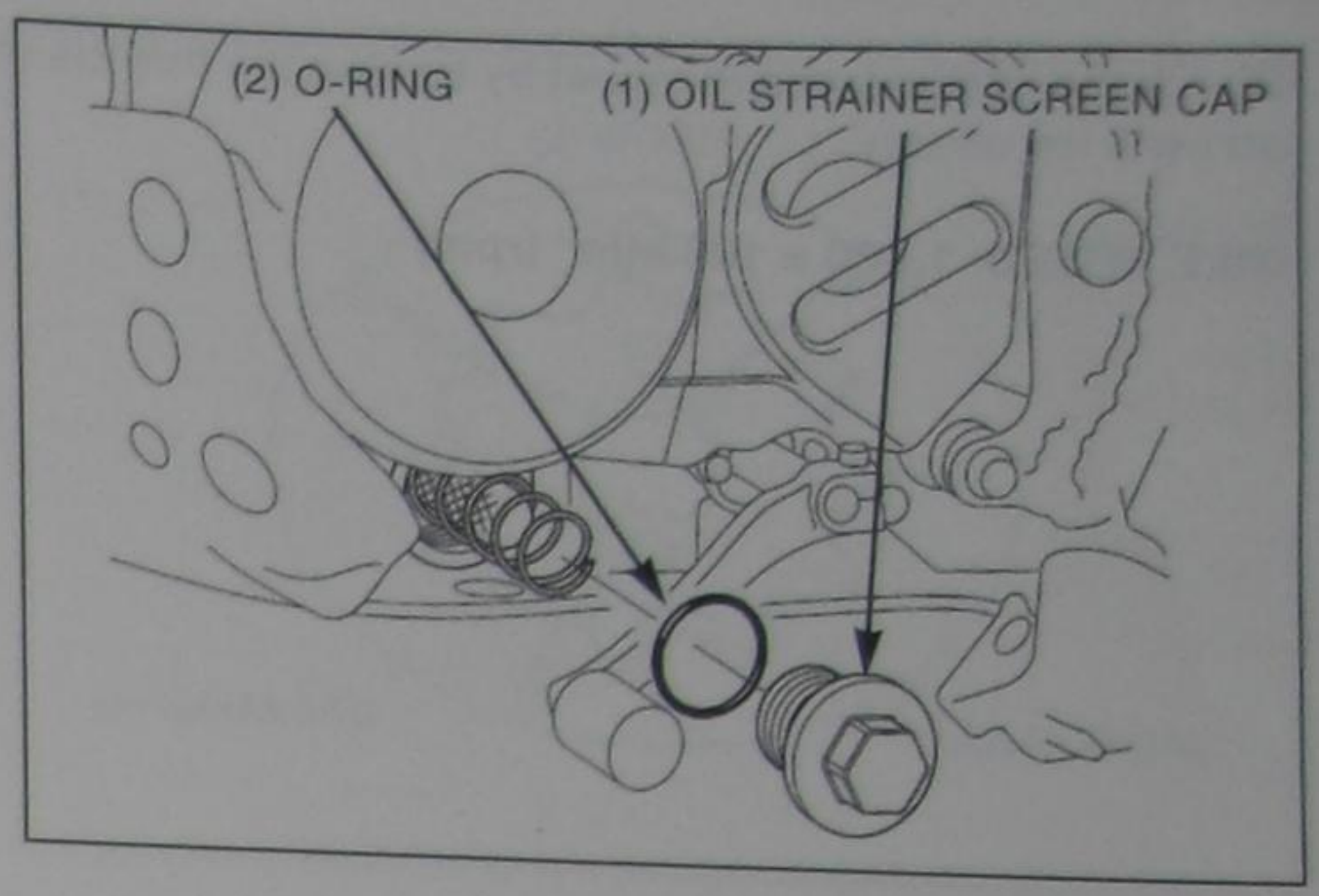
- Drain the engine oil while the engine is warm. This ensure complete and rapid draining.

Place the motorcycle on its side stand.
Remove the oil filler cap/dipstick.
Place an oil drain pan under the engine to catch the oil, then remove the oil strainer screen cap.



**⚠ WARNING**

- **Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil in a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil. KEEP OUT OF REACH OF CHILDREN.**



NOTE:

- If the maintenance for the engine oil strainer screen cap is in good condition and replace it with a new one if necessary.

Check that the O-ring on the oil strainer screen cap is in good condition and replace it with a new one if necessary.
Install the oil strainer screen cap and tighten it.

**TORQUE: 15 N·m (1.5 kgf-m, 11 lbf-ft)**

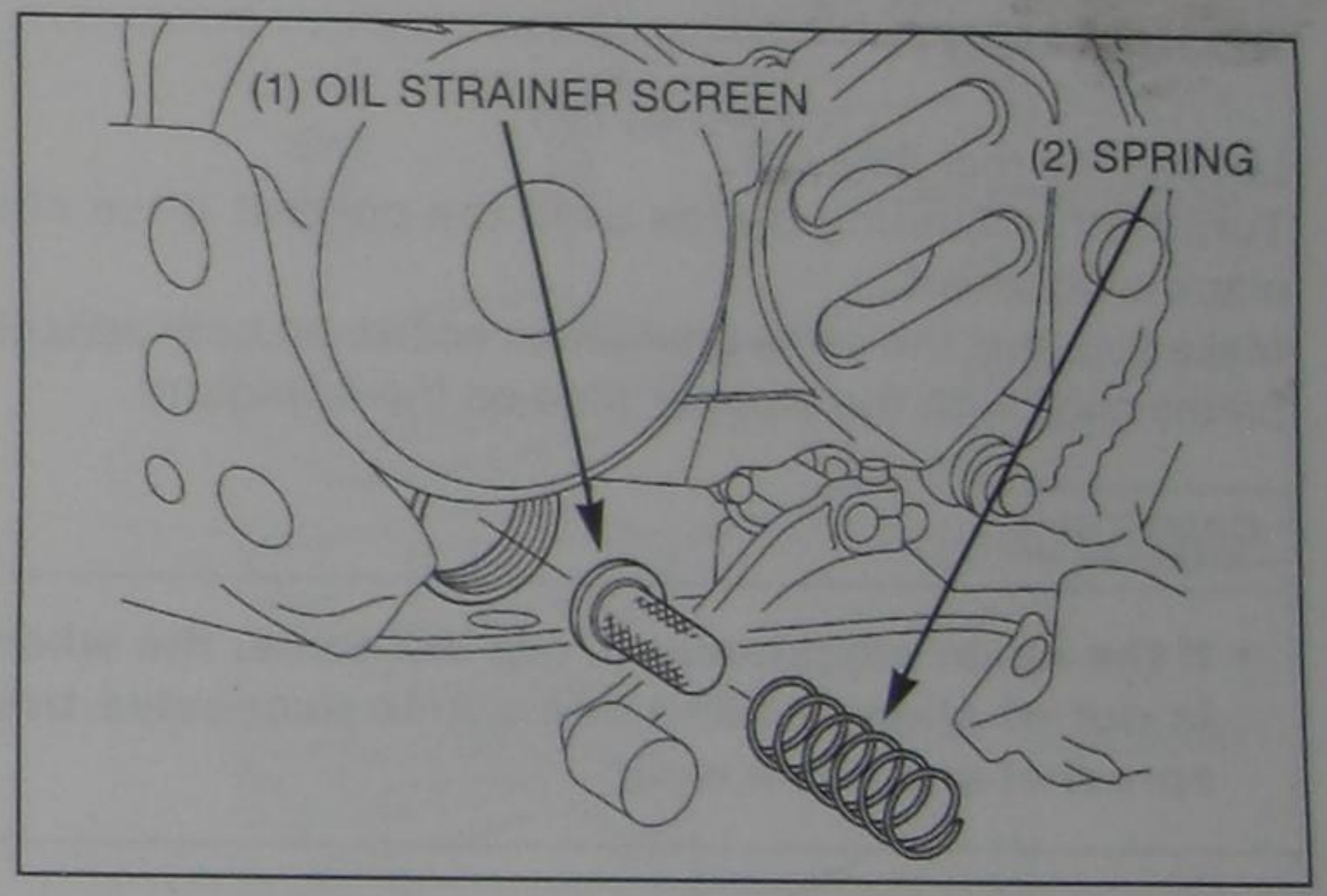
Fill the crankcase with the recommended engine oil (page 3-8).

**ENGINE OIL CAPACITY:**
**1.0 liter (1.06 US qt, 0.88 Imp qt) at oil change**
**1.2 liters (1.27 US qt, 1.06 Imp qt) at disassembly**

Install the oil filler cap/dipstick.
Check the oil level (page 3-7).

Make sure that there are no oil leaks.

## Engine Oil Strainer Screen



Drain the engine oil.

Remove the spring and oil strainer screen.
Clean the oil strainer screen thoroughly.
Check the screen for damage and the sealing rubber for damage or deterioration and replace the oil strainer screen if necessary.

Install the oil strainer screen cap and fill the crankcase with recommended engine oil (see above).

## Engine Idle Speed

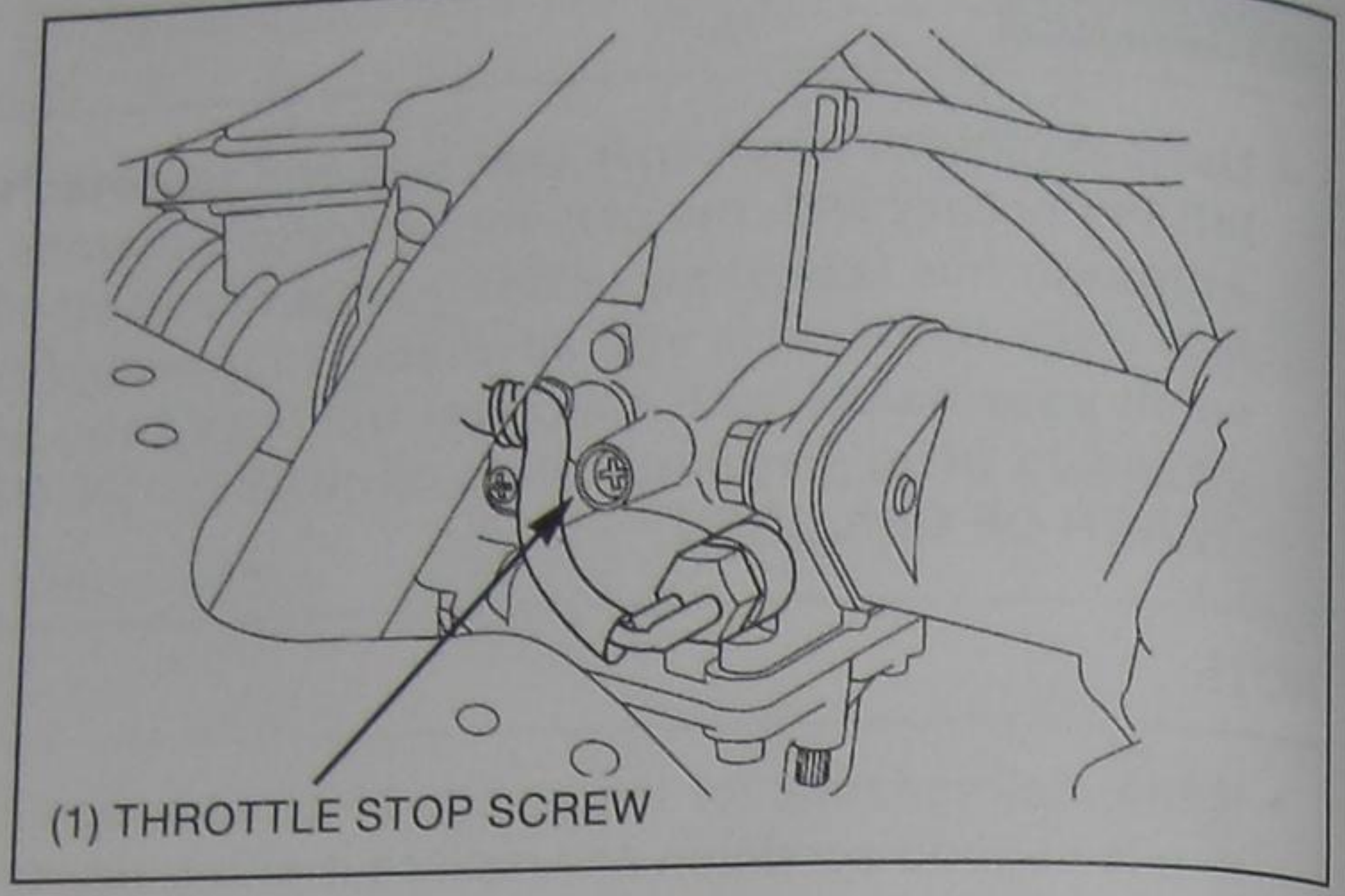
NOTE:

- Inspect and adjust the idle speed after all other engine adjustments are within specifications.
- The engine must be warm for accurate inspection and adjustment.

Warm up the engine to normal operating temperature.
Place the motorcycle on its side stand on level ground and shift the transmission into neutral.

*Check the idle speed and adjust by turning the throttle stop screw if necessary.*

**IDLE SPEED: 1,400 ± 100 $\text{min}^{-1}$ (rpm)**



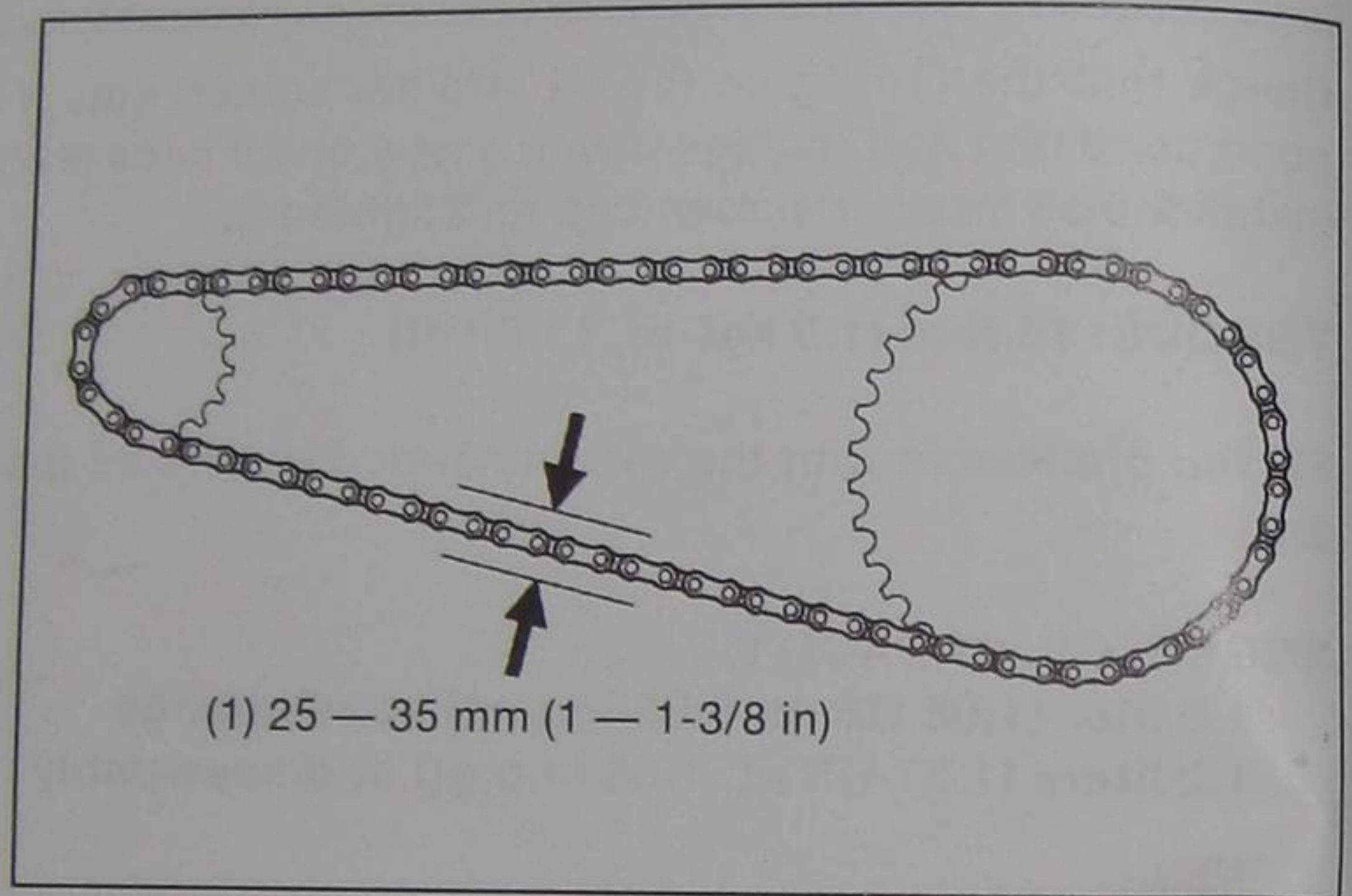
## Drive Chain

**⚠ WARNING**

- **Never inspect and adjust the drive chain while the engine is running.**

### INSPECTION

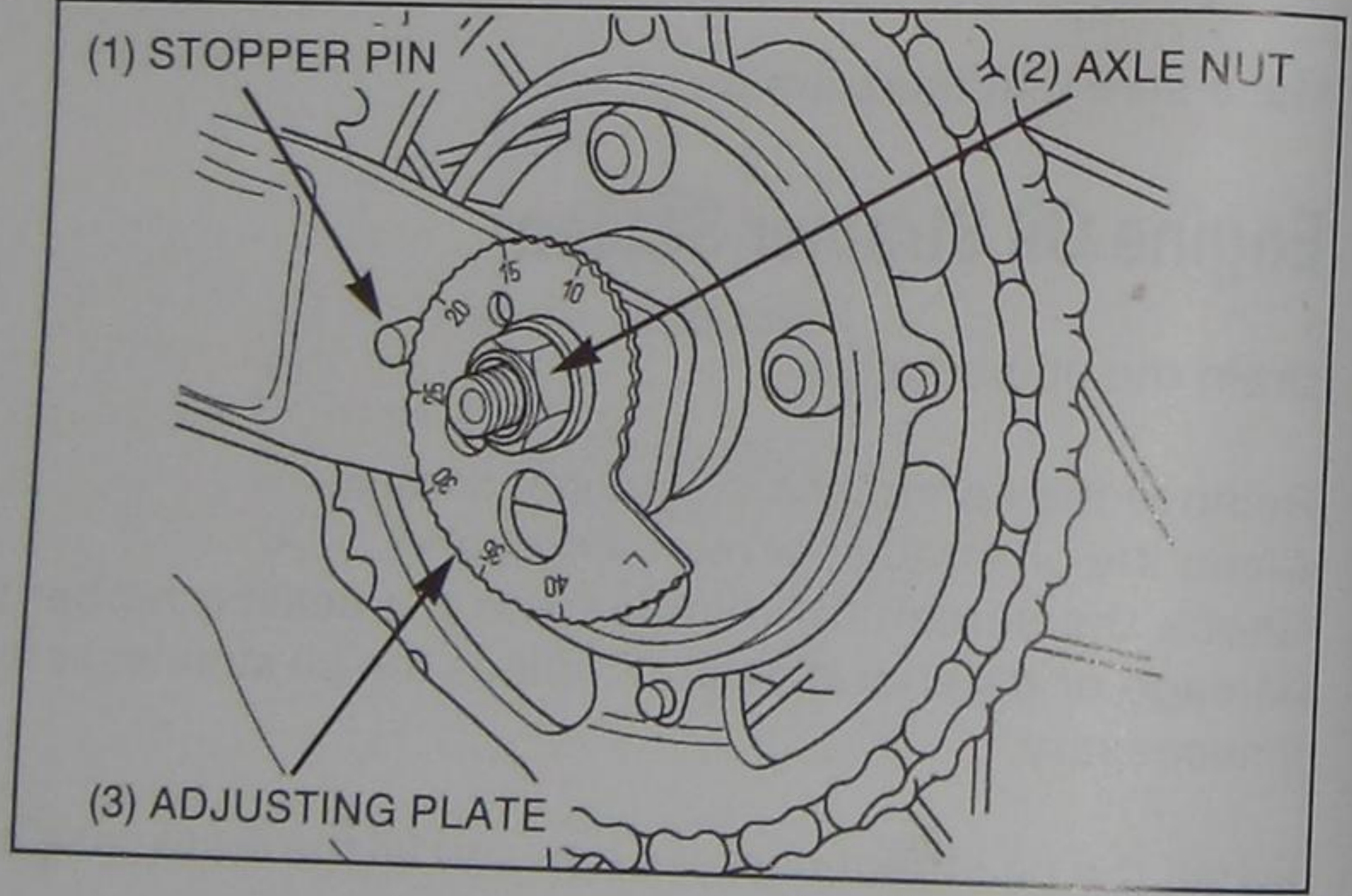
With the engine stopped, place the motorcycle on its side stand and shift the transmission into neutral.
Measure the drive chain slack in the lower drive chain run midway between the sprockets.



**DRIVE CHAIN SLACK: 25 - 35 mm (1 — 1-3/8 in)**

### ADJUSTMENT

Loosen the rear axle nut.
Turn both adjusting plates until the correct drive chain slack is obtained.
Make sure that the same graduation scales on both adjusting plates align with the stopper pins on the swingarm.



CAUTION

- **If the chain adjustment is not the same, the wheel is out of aligment and can cause excessive tire, sprocket and chain wear.**

Tighten the rear axle nut.

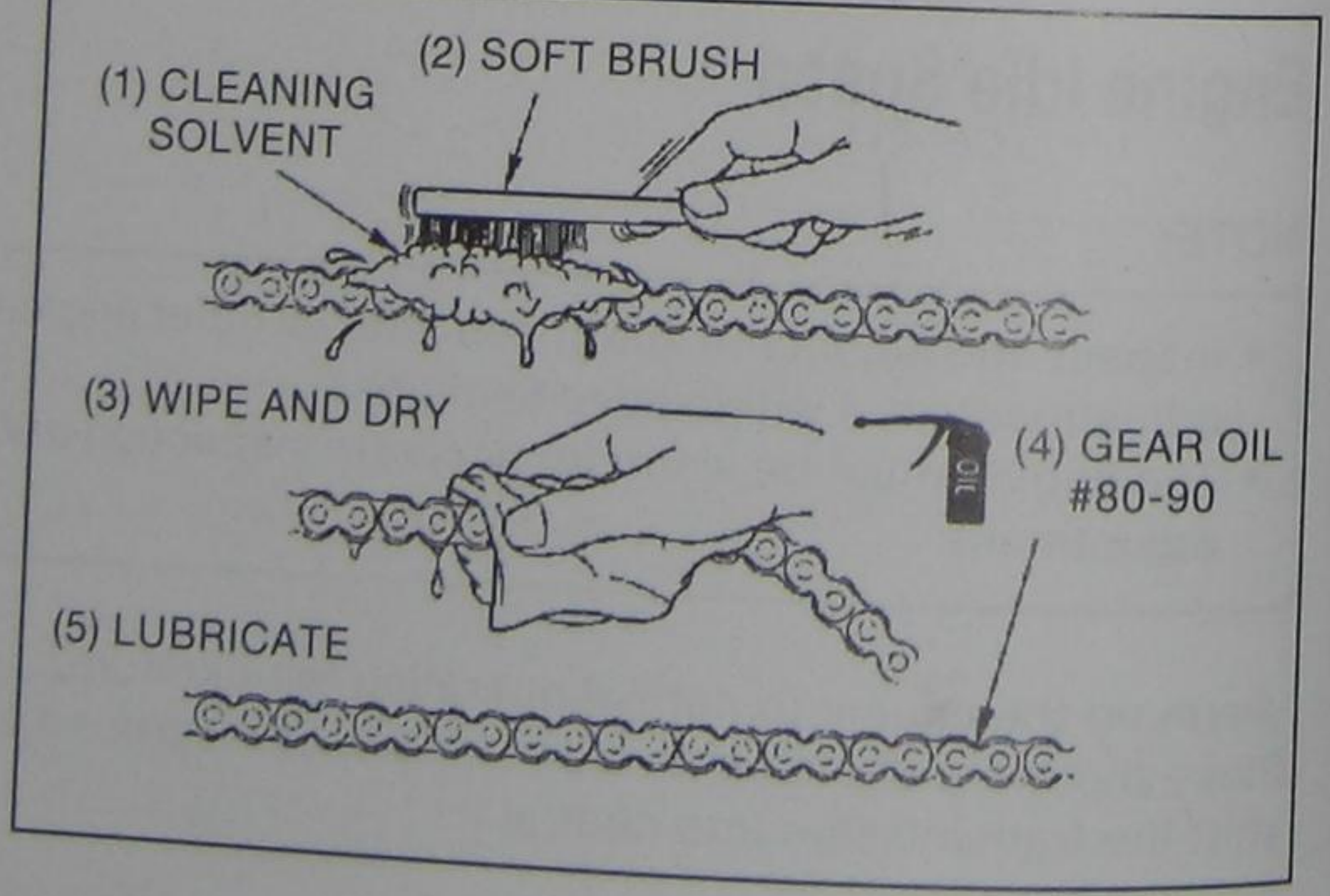
**TORQUE: 88 N·m (9.0 kgf-m, 65 lbf-ft)**

Recheck the drive chain slack and free wheel rotation.

### CLEANING/LUBRICATION

Clean the chain with non-flammable or high flash point solvent and wipe it dry.
Be sure the chain has dried completely before lubricating.
Inspect the drive chain for wear or damage.
Replace the drive chain if it is worn excessively or damaged.

Lubricate the drive chain with #80-90 gear oil drive chain lubricant.
Wipe off the excess oil or chain lubricant.



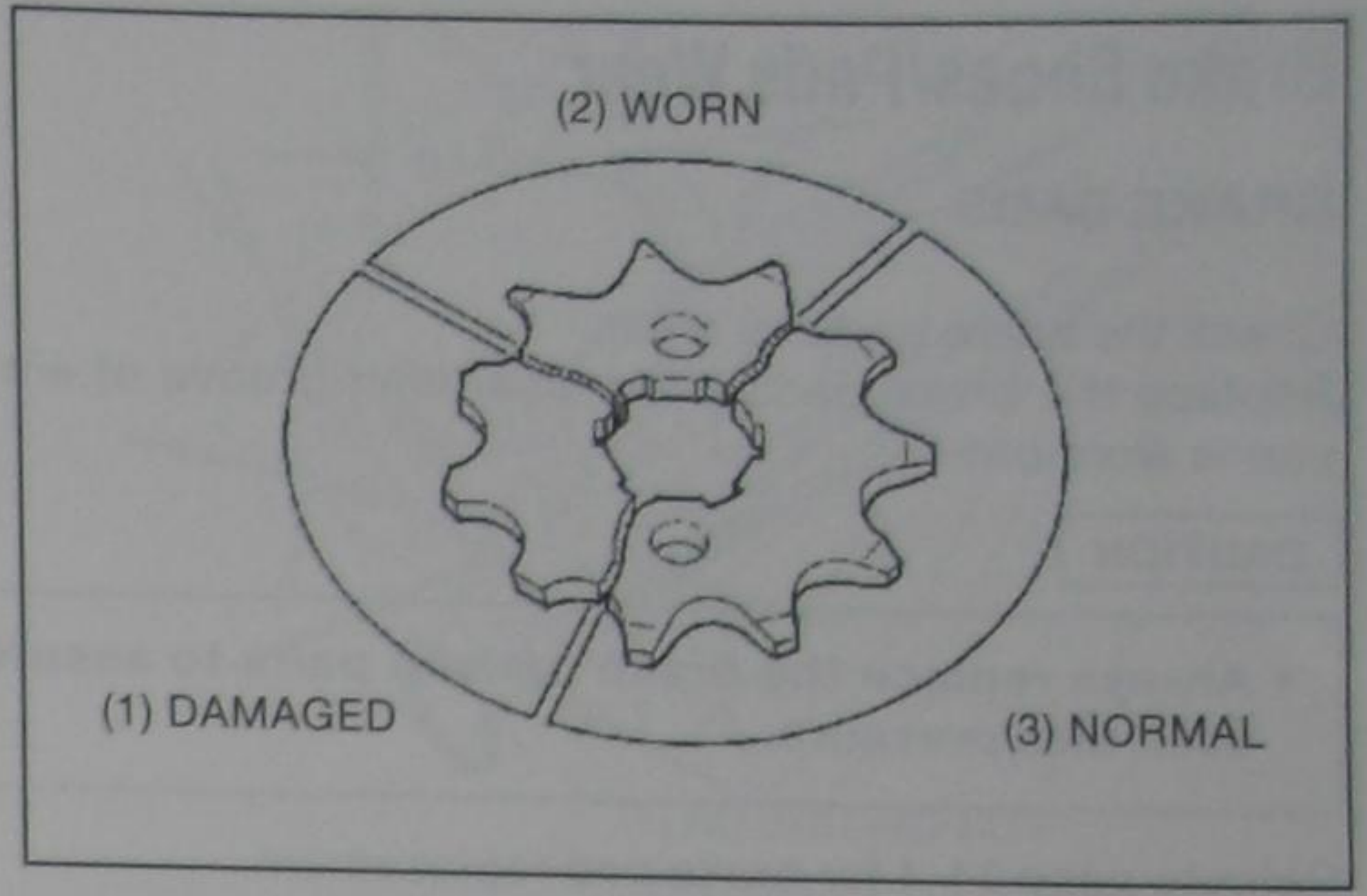
### SPROCKET INSPECTION

Inspect the drive and driven sprocket teeth for wear or damage. Replace if necessary.

NOTE:

- Never install a new drive chain on worn sprockets or a worn chain on news sprockets. Both chain and sprockets must be in good condition, or the new replacement chain or sprockets will wear rapidly.

Check the attaching bolts and nuts on the drive and driven sprockets. If any are loose, torque them.



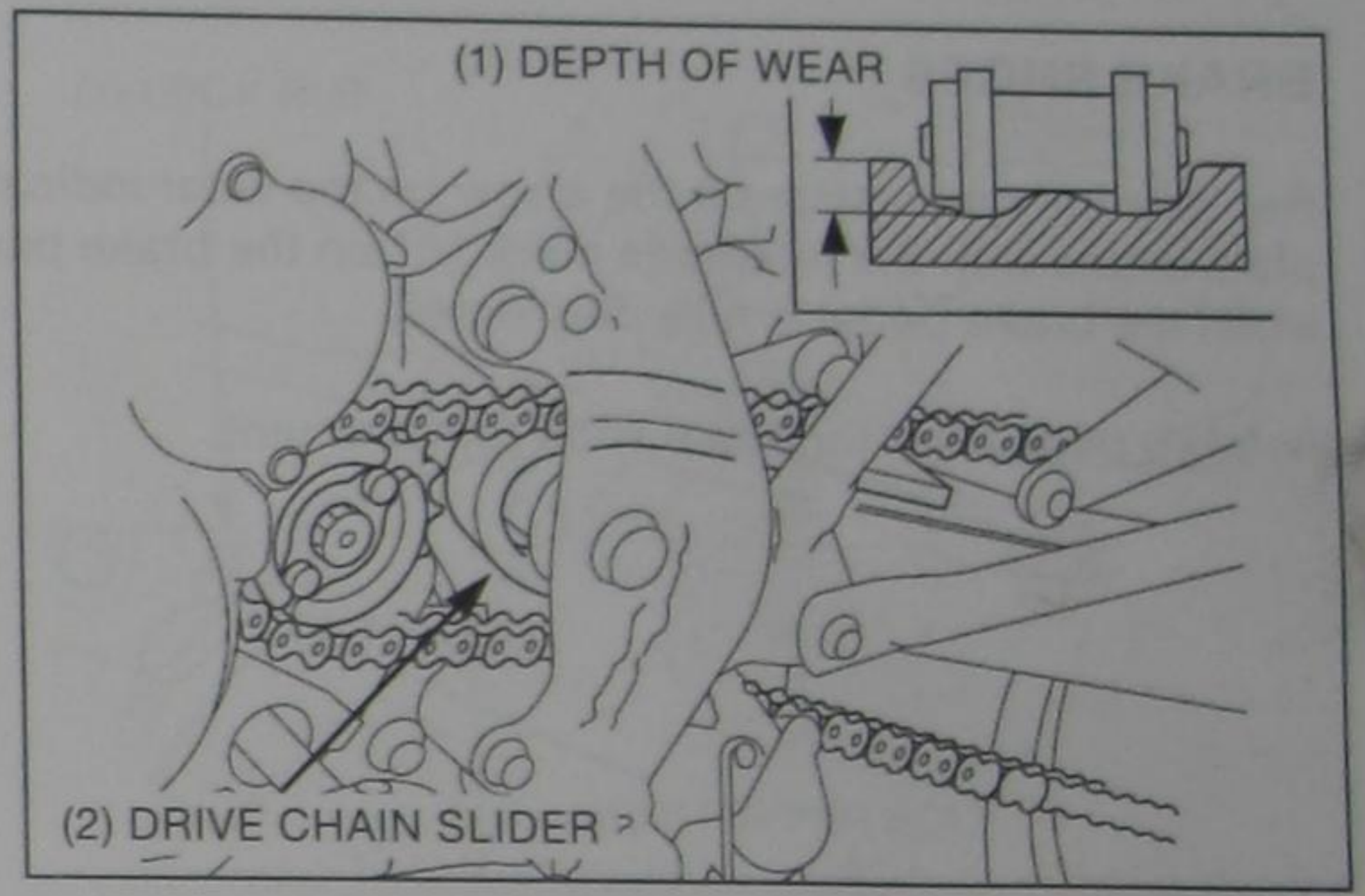
## Drive Chain Slider

Remove the drive sprocket cover (page 6-2).

Check the drive chain slider for depth of wear.

**SERVICE LIMIT: 2 mm (0.1 in)**

Refer to section 14 for drive chain slider replacement.



## Brake Fluid

CAUTION

- **Do not mix different types of fluid, as they are not compatible with each other.**
- **Do not allow foreign material to enter the system when filling the reservoir.**
- **Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.**

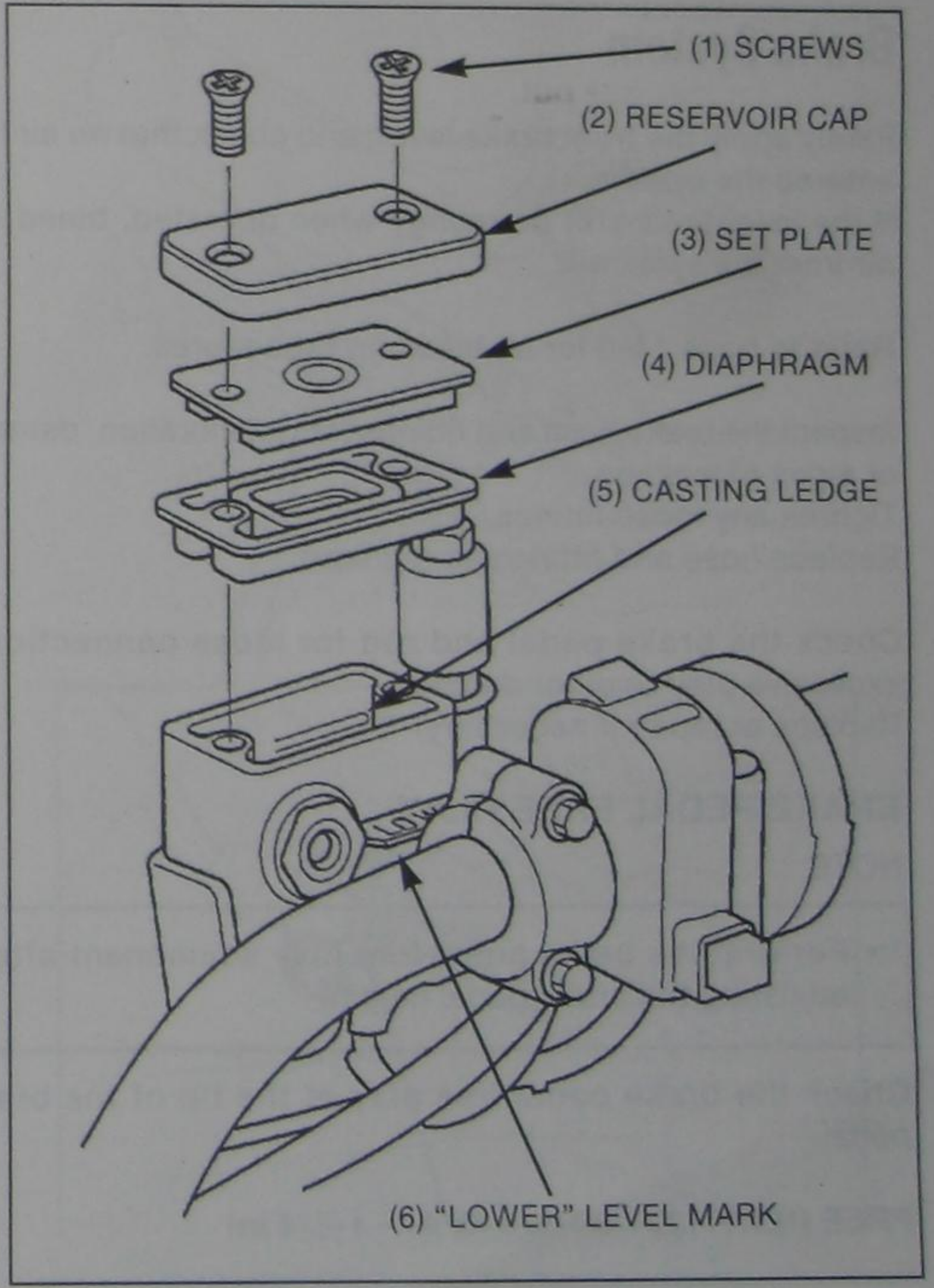
NOTE:

- When the fluid level is low, check the brake pads for wear (page 3-12). A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper pistons are pushed out, and this accounts for a low reservoir level.
- If the brake pads are not worn and the fluid level is low, check entire system for leaks (page 3-12).

Turn the handlebar so that the reservoir is level and check the brake fluid level through the sight glass.
If the fluid level nears the "LOWER" level mark, remove the two screws, reservoir cap, set plate and diaphragm. Fill the reservoir to the casting ledge with DOT 4 brake fluid from a sealed container.

Install the diaphragm, set plate and reservoir cap, and tighten the two screws.

**TORQUE: 2 N·m (0.2 kgf-m, 1.4 lbf-ft)**



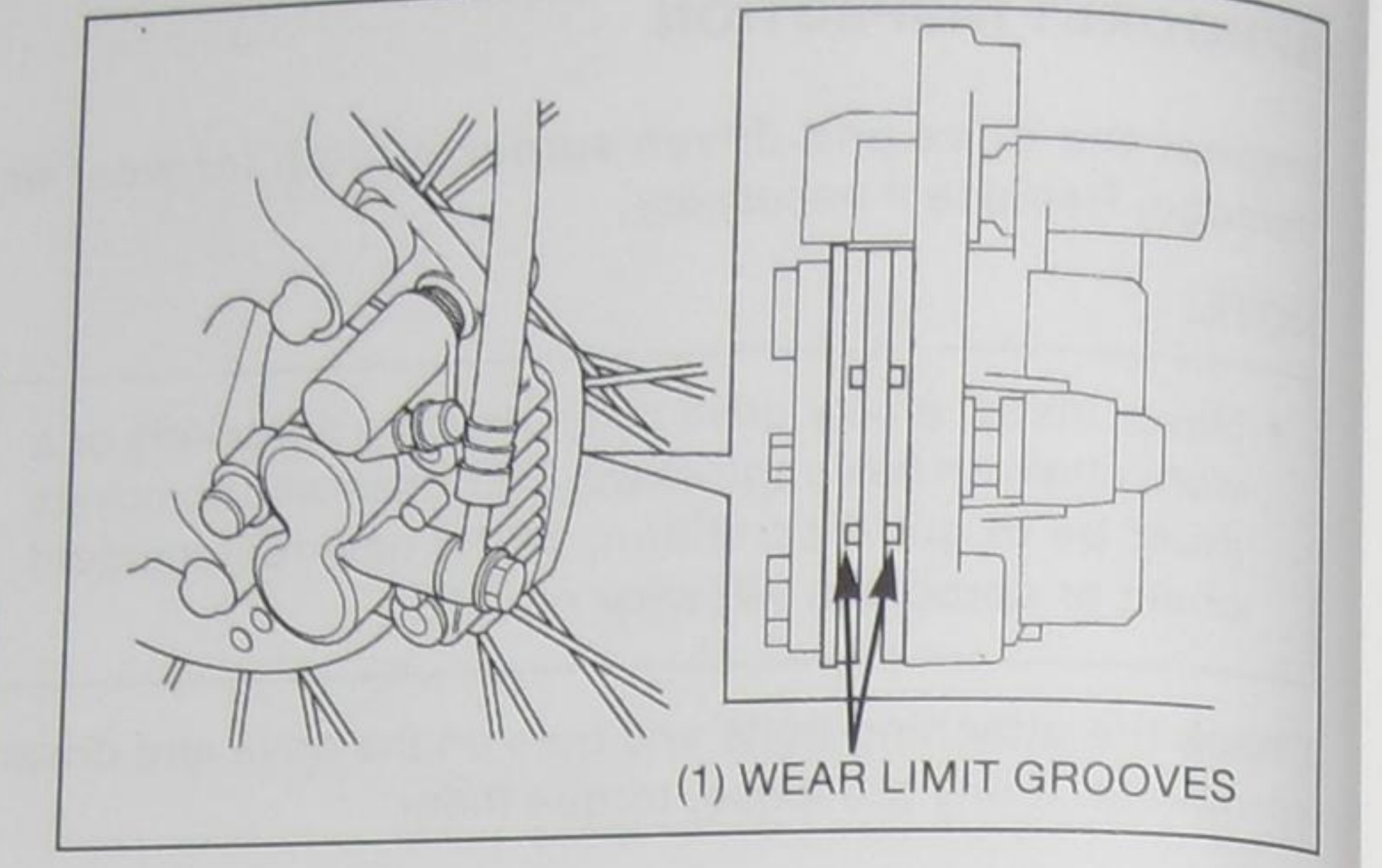
## Brake Shoes/Pads Wear

### BRAKE PADS

Check the brake pads for wear.
Replace the brake pads if the wear limit groove of either pad is worn out.

**CAUTION**

- **Always replace the brake pads in pairs to assure even disc pressure.**

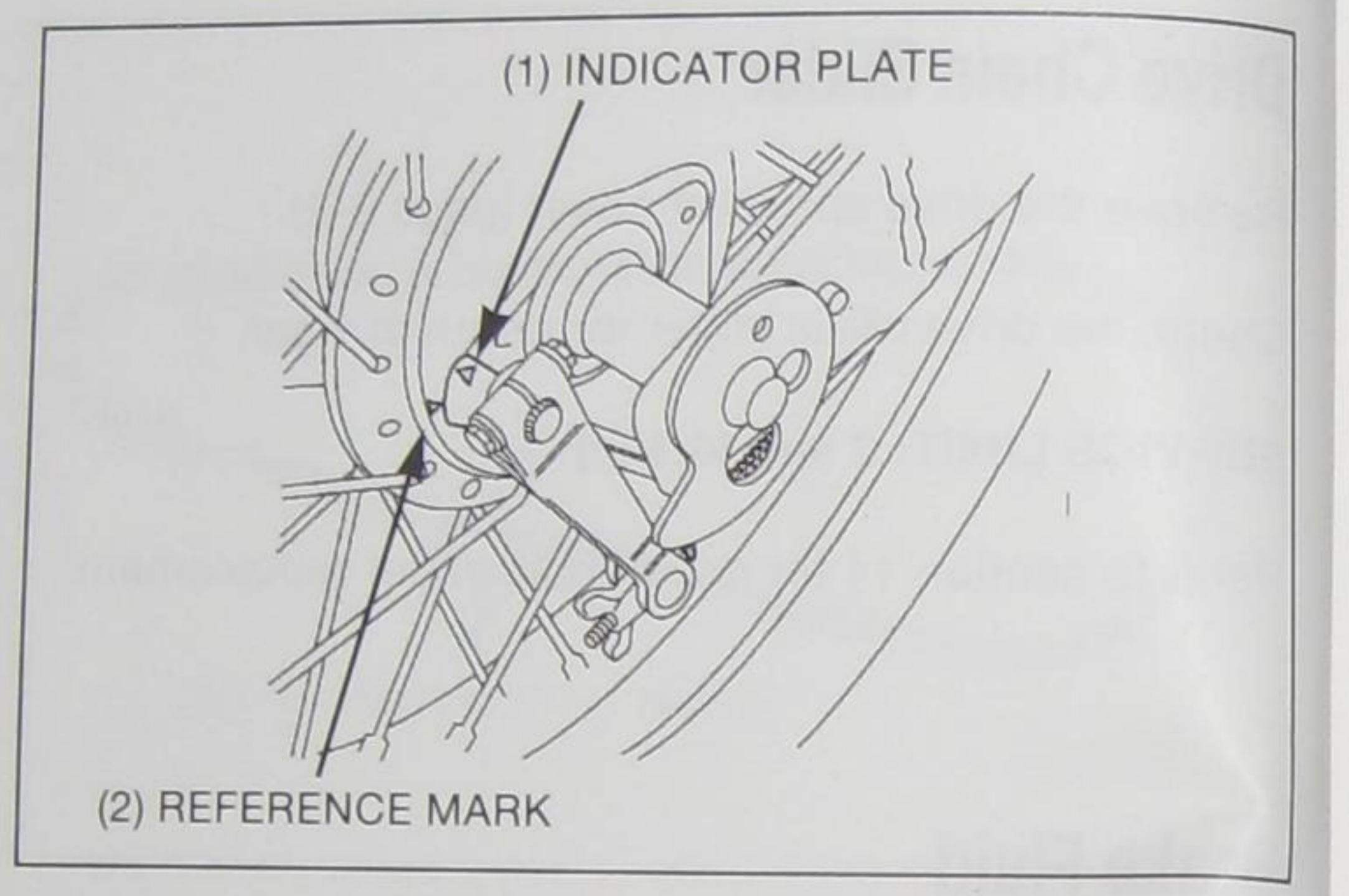


Refer to page 14-4 for brake pad replacement.

### BRAKE SHOES

Replace the brake shoes if the arrow on the wear indicator plate aligns with the reference mark "Δ" on the brake panel when the brake pedal is fully depressed.

Refer to page 13-7 for brake shoe replacement.

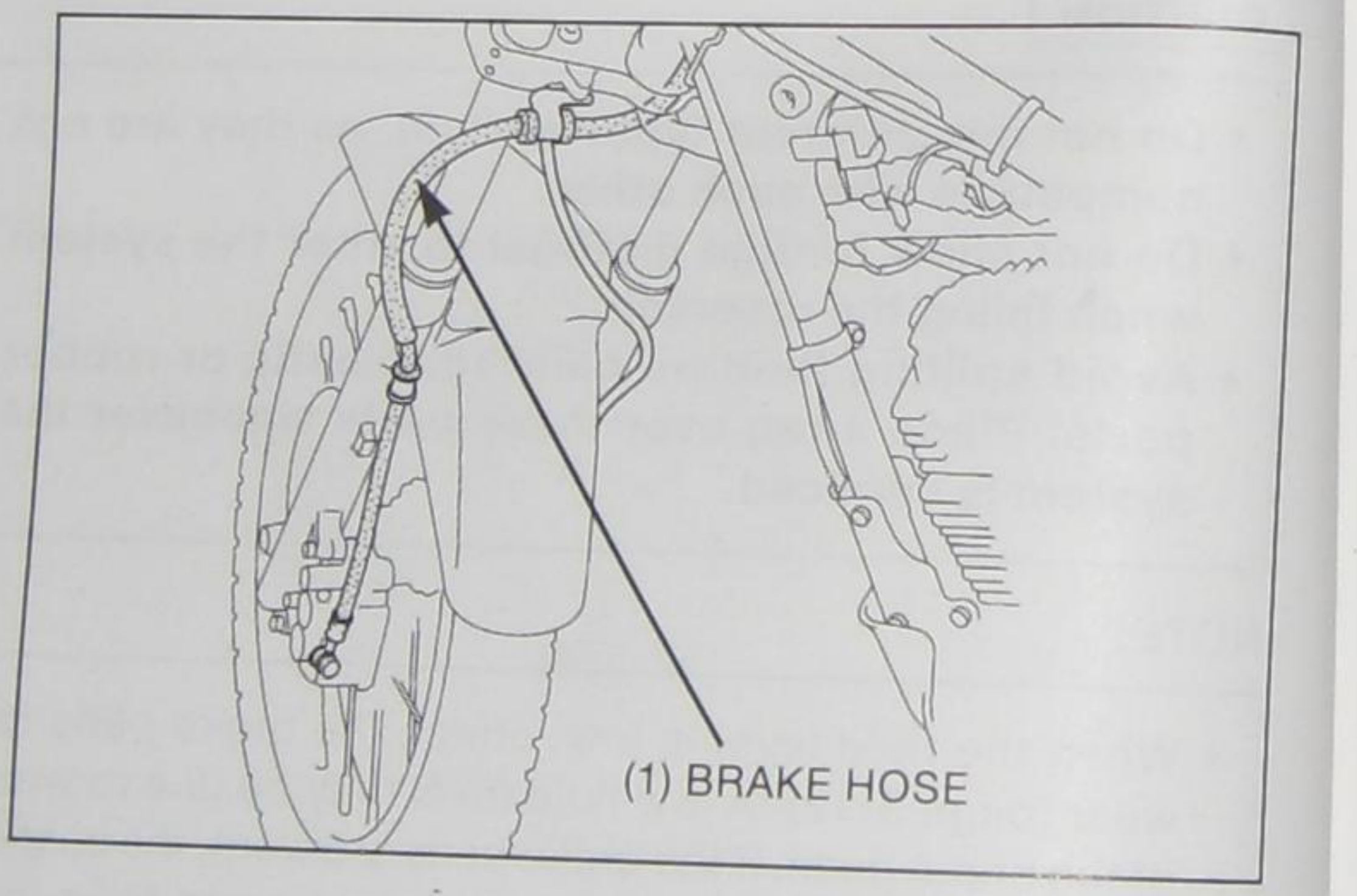


## Brake System

Firmly apply the front brake lever, and check that no air has entered the system.
If the lever feels soft or spongy when operated, bleed the air from the system.

Refer to page 14-3 for air bleeding procedures.

Inspect the brake hose and fittings for deterioration, damage or signs of leakage.
Tighten any loose fittings,
Replace hose and fittings as required.



Check the brake pedal and rod for loose connections, excessive play or other damage.
Replace or repair if necessary.

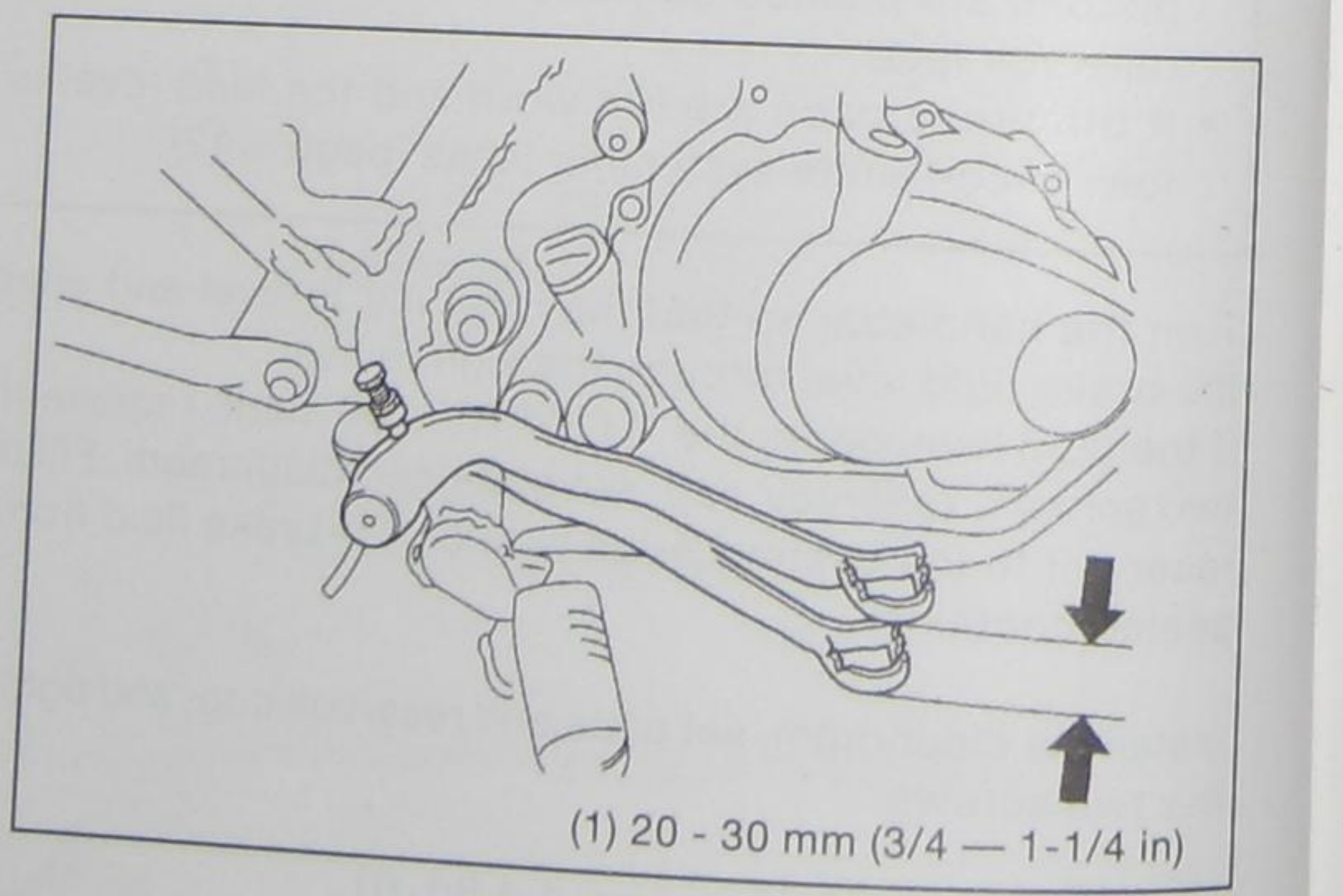
### BRAKE PEDAL FREE PLAY

NOTE:

- Perform the brake pedal free play adjustment after adjusting the brake pedal height.

Check the brake pedal free play at the tip of the brake pedal.

**FREE PLAY: 20 - 30 mm (3/4 — 1-1/4 in)**

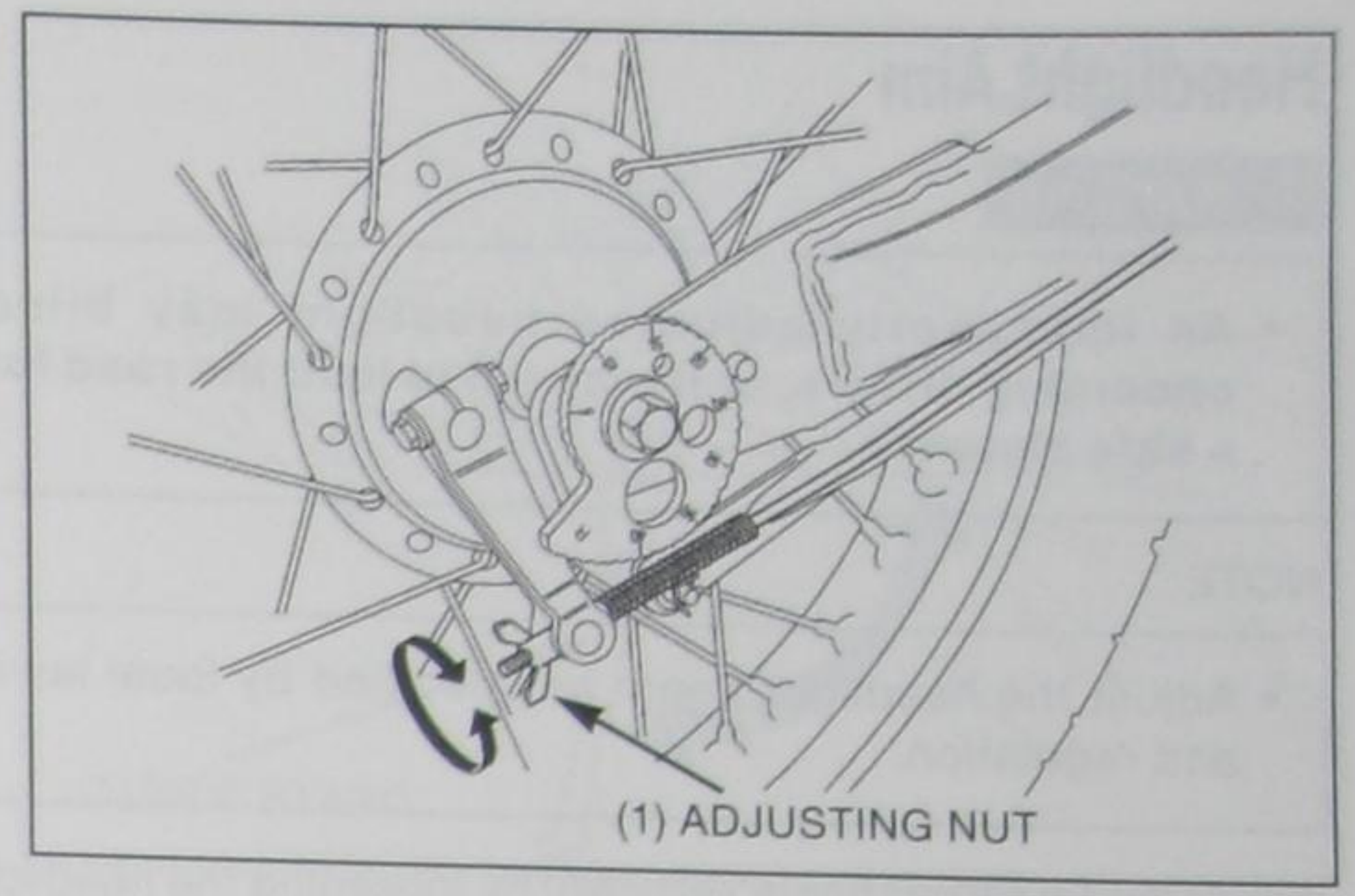


Adjust the brake pedal free play by turning the adjusting nut.

NOTE:

- Make sure that the cutout in the adjusting nut is seated on the brake arm joint.

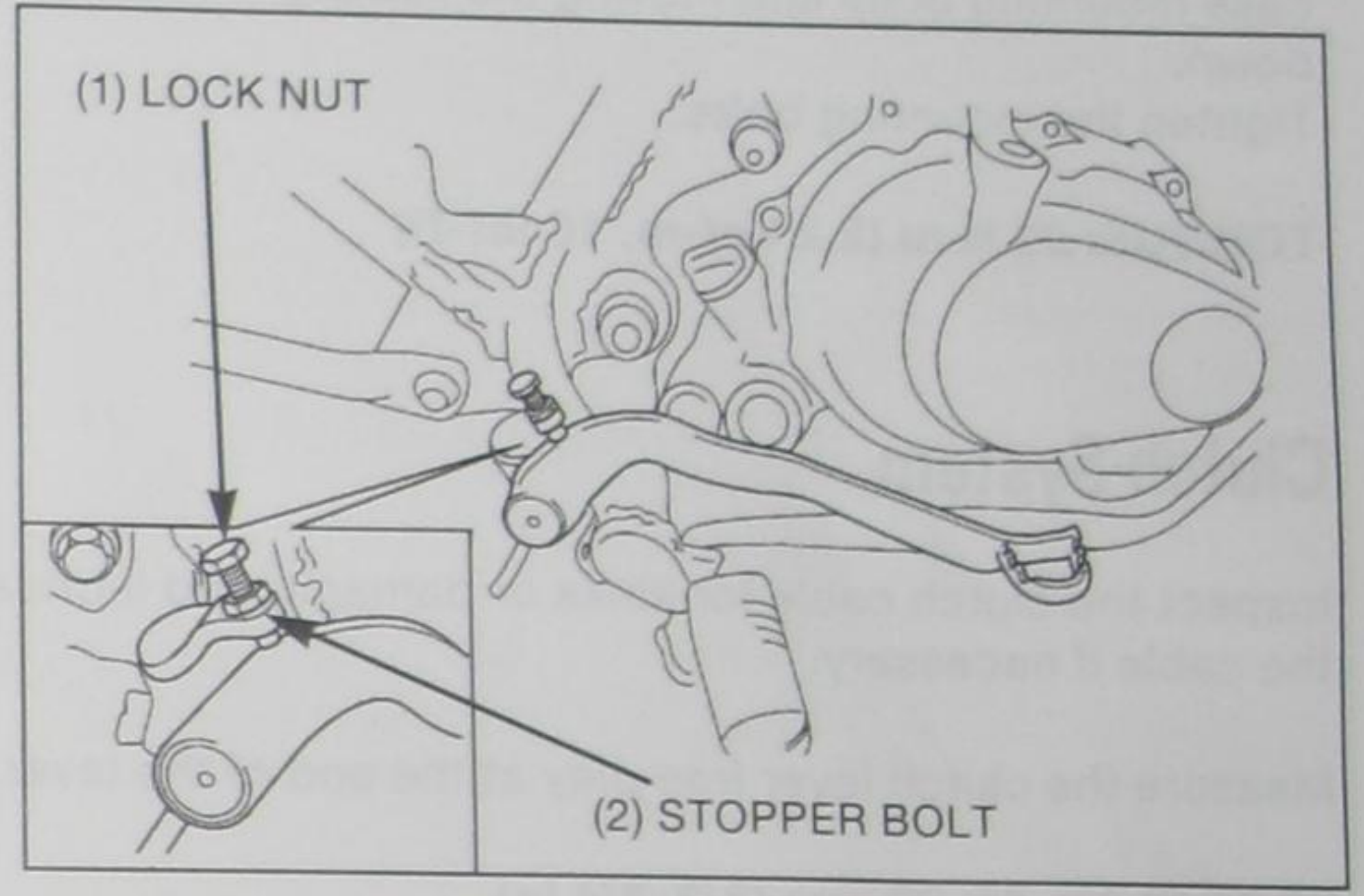
After adjusting the brake pedal free play, check the rear brake light switch operation and adjust if necessary.



### BRAKE PEDAL HEIGHT

The brake pedal height can be adjusted by loosening the lock nut and turning the stopper bolt.

After adjusting the brake pedal height, check the brake pedal free play and rear brake light switch operation and adjust if necessary.



## Brake Light Switch

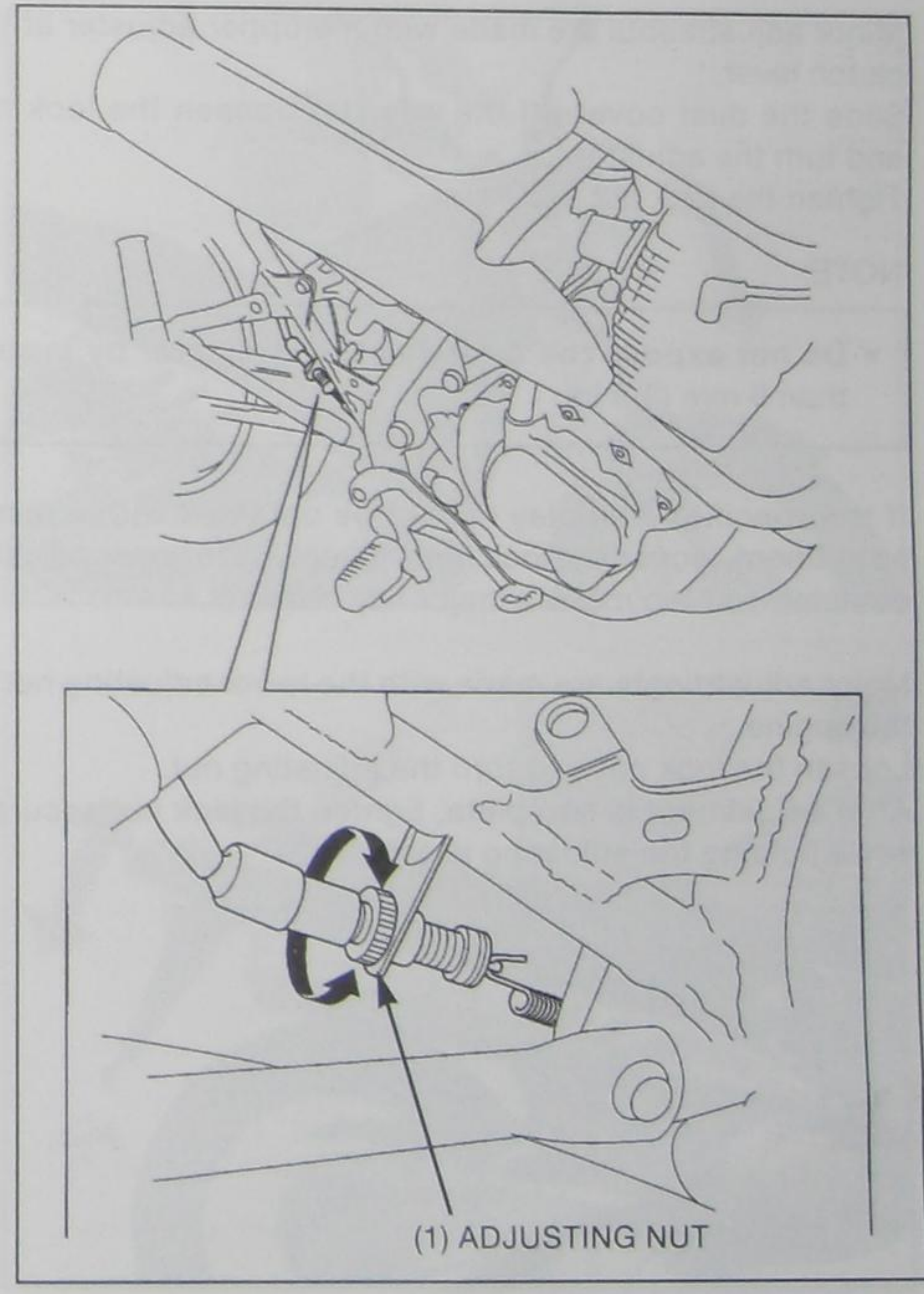
NOTE:

- Perform brake light switch adjustment after adjusting the brake pedal height and free play.
- The front brake light switch cannot be adjusted. If the front brake light switch actuation and brake engagement are off, either replace the switch unit or the malfunctioning parts of the system.

Check that the brake light comes on when the brake pedal is depressed and the brake engagement begins.
To adjust, hold the switch body and turn the adjusting nut.

**CAUTION**

- **Do not turn the brake light switch body.**



## Headlight Aim

**⚠ WARNING**

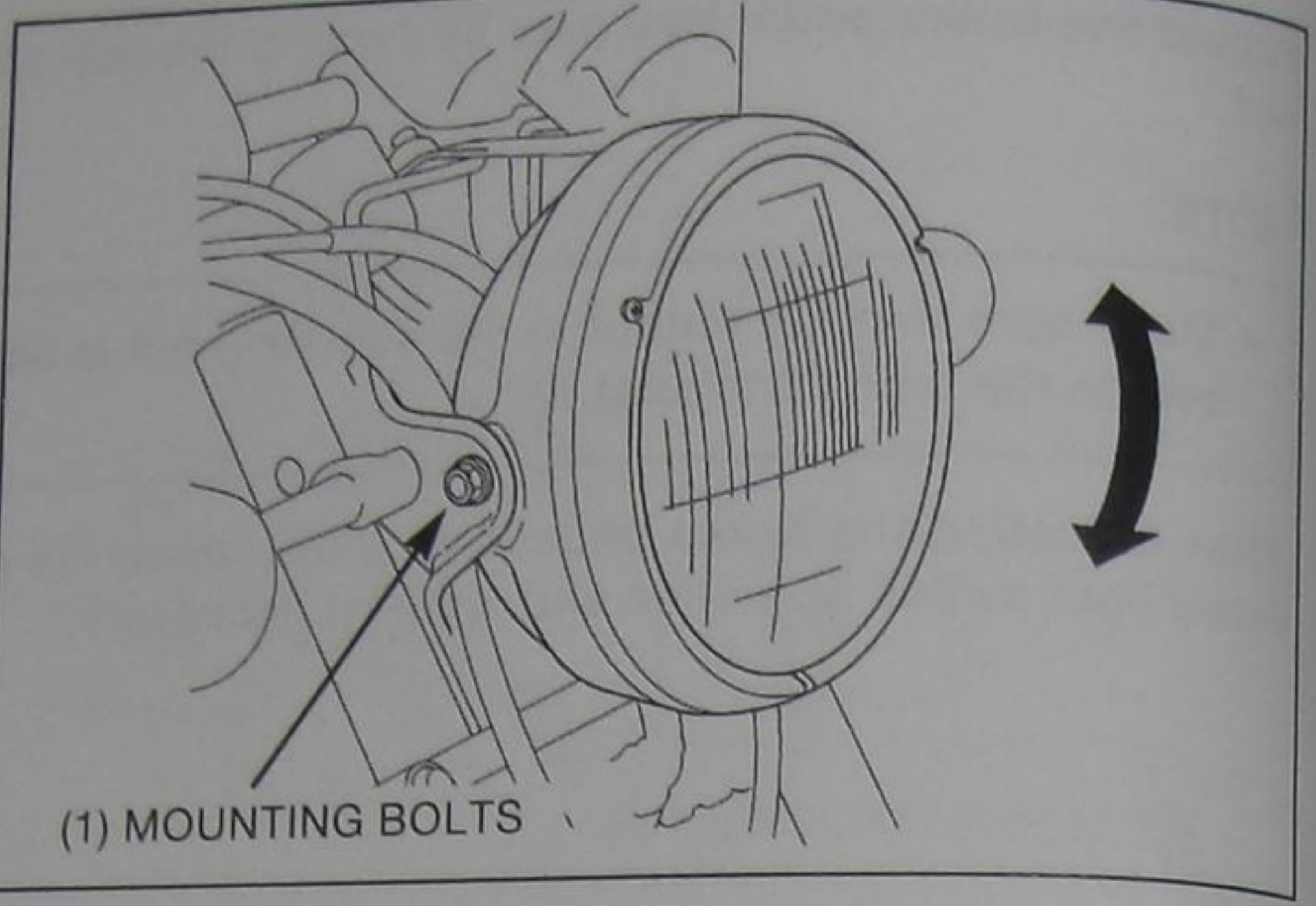
- **An improperly adjusted headlight may blind oncoming drivers, or it may fail to light the road for a safe distance.**

NOTE:

- Adjust the headlight beam as specified by local laws and regulation.

Adjust the headlight beam vertically by loosening the headlight case mounting bolts and moving the headlight case up and down.
Tighten the mounting bolts.

**TORQUE: 22 N·m (2.2 kgf-m, 16 lbf-ft)**

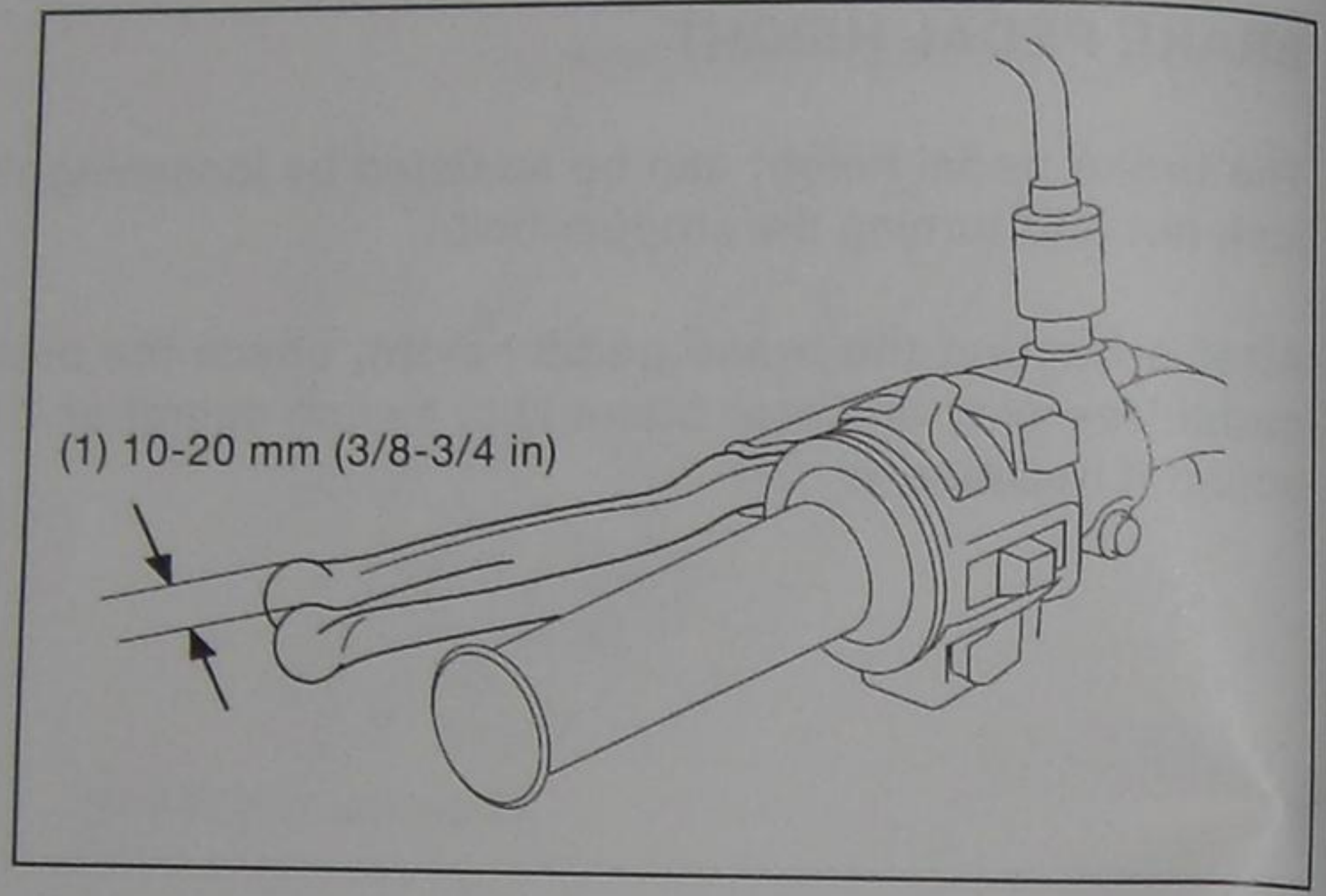


## Clutch System

Inspect the clutch cable for kinks or damage, and lubricate the cable if necessary.

Measure the clutch lever free play at the end of the lever.

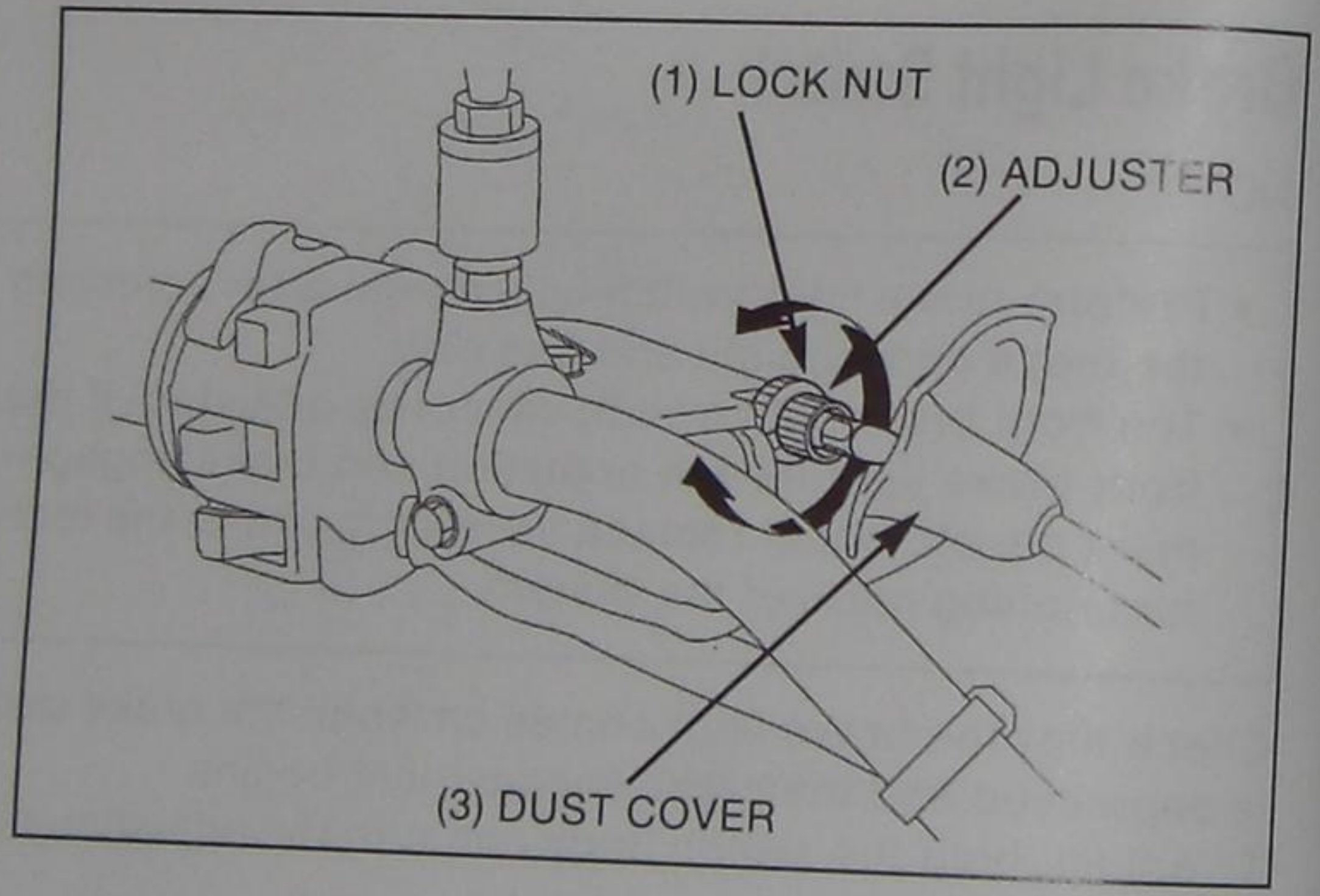
**FREE PLAY: 10-20 mm (3/8-3/4 in)**



Minor adjustments are made with the upper adjuster at the clutch lever.
Slide the dust cover off the adjuster, loosen the lock nut and turn the adjuster.
Tighten the lock nut securely.

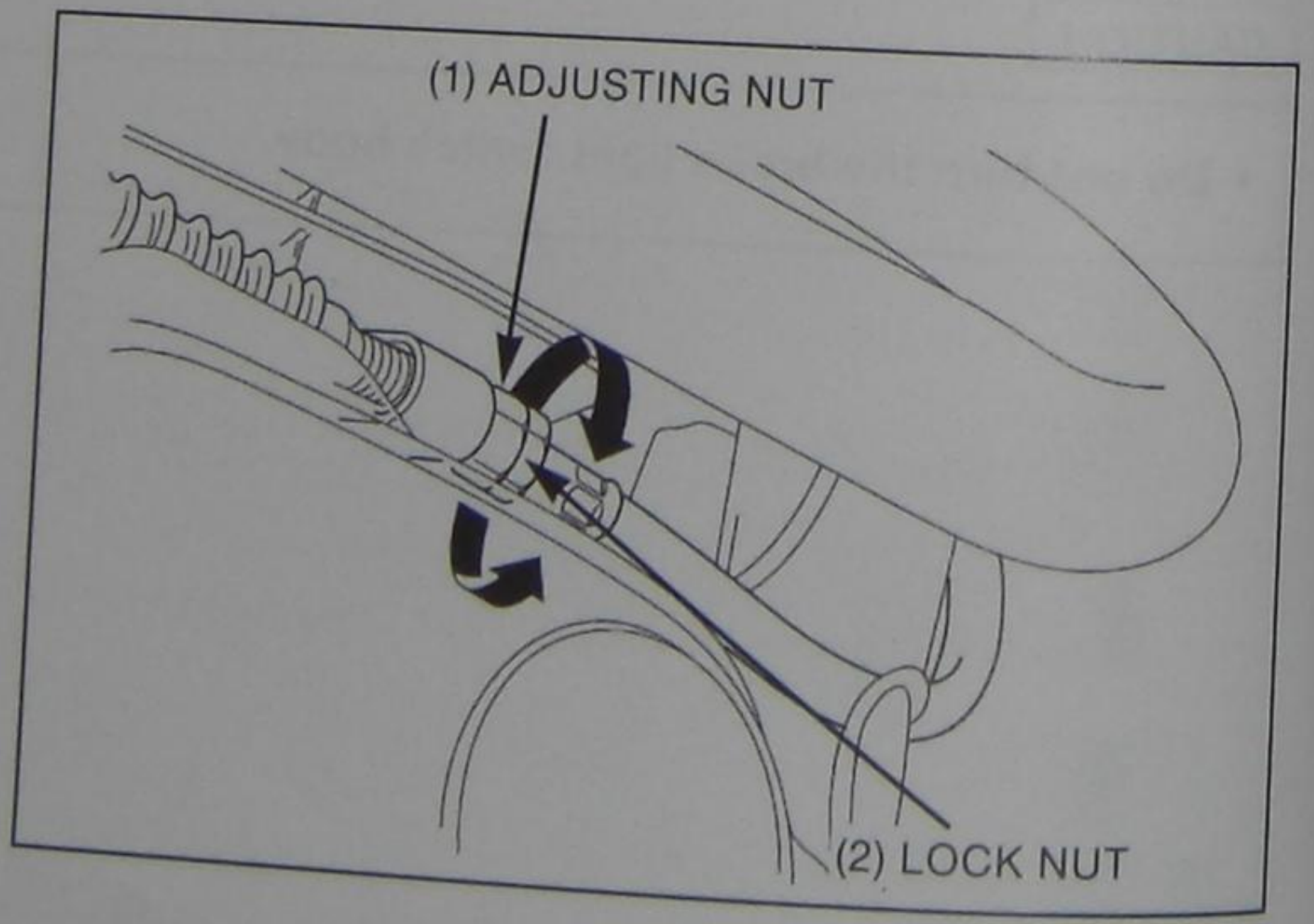
NOTE:

- Do not expose the threads of the adjuster by more than 8 mm (3.8 in).



If the specified free play cannot be obtained with a minor adjustment, loosen the lock nut and turn in the upper adjuster completely; then make a major adjustment.

Major adjustments are made with the lower adjusting nut at the engine.
Loosen the lock nut and turn the adjusting nut.
After adjustment is complete, tighten the lock nut securely while holding the adjusting nut.



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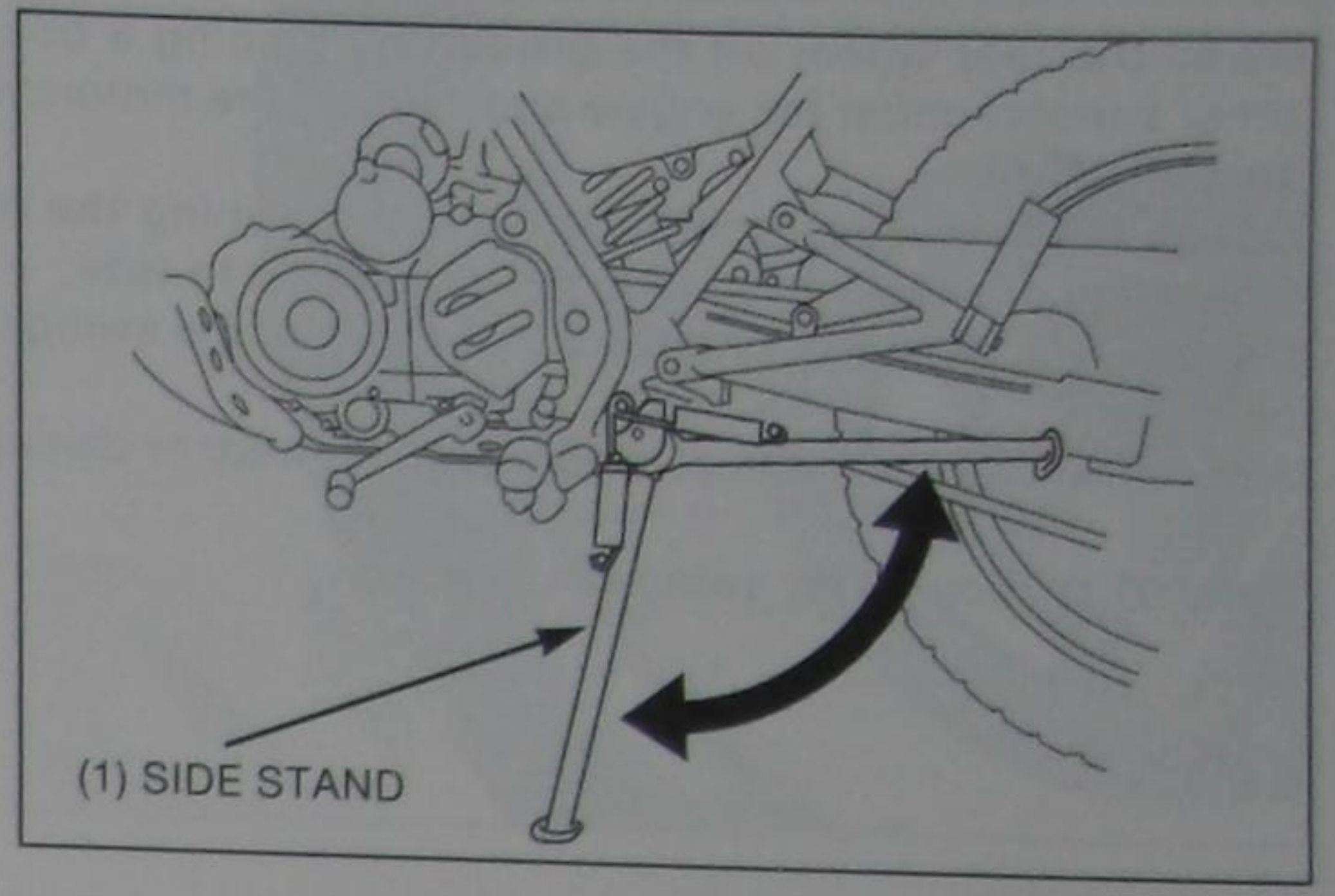
## Side Stand

Support the motorcycle on a level surface.

Check the side stand spring for damage or loss of tension.
Check the side stand assembly for freedom of movement and lubricate the side stand pivot if necessary.

Check the side stand ignition cut-off system:
- Sit astride the motorcycle and raise the side stand.
- Start the engine with the transmission in neutral, then shift the transmission into gear, while squeezing the clutch lever.
- Fully lower the side stand.
- The engine should stop as the side stand is lowered.

If there is a problem with the system, check the side stand switch (page 18-6).



## Suspension

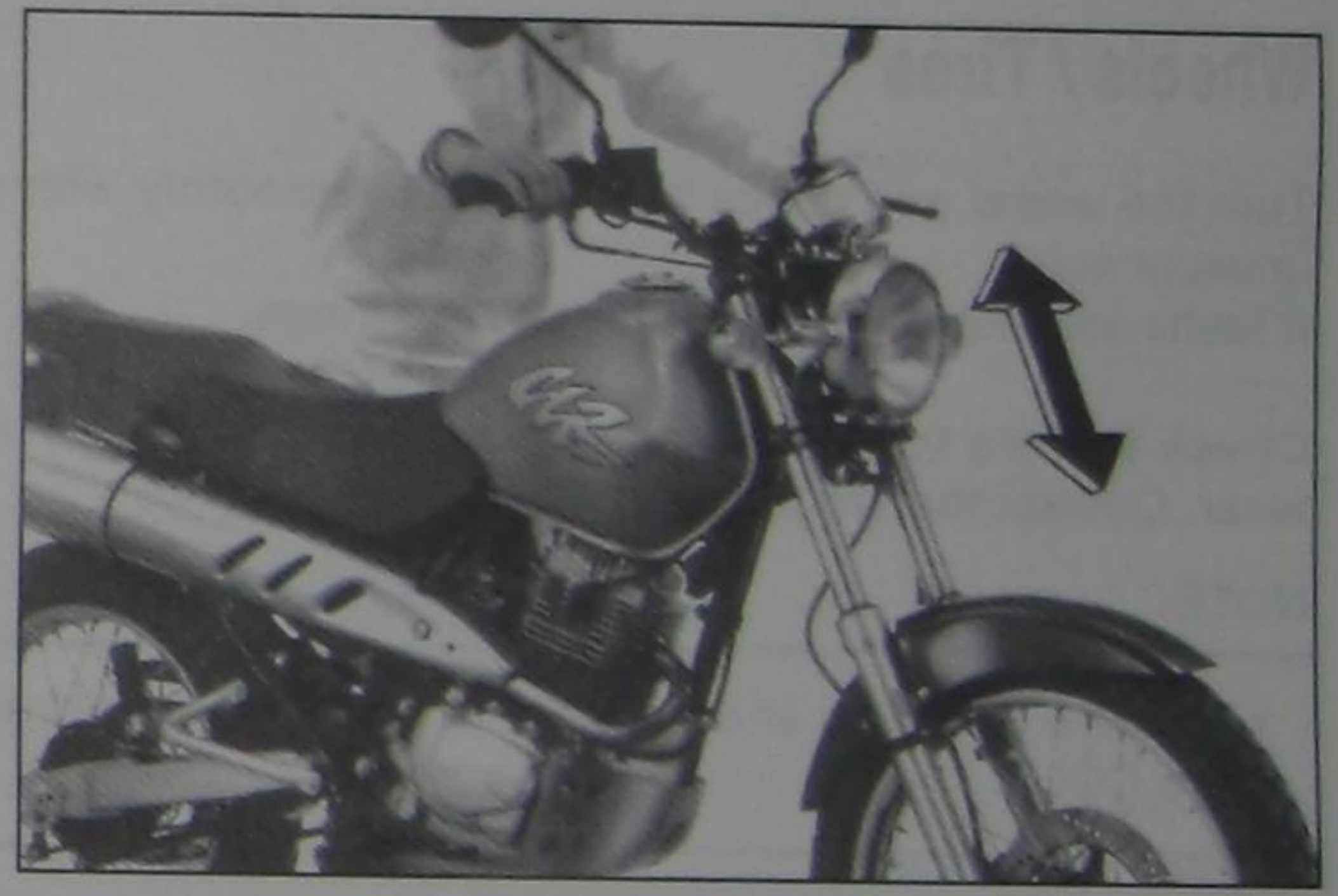
**⚠ WARNING**

- **Loose, worn or damaged suspension parts impair motorcycle stability and control. Repair or replace any damaged components before riding. Riding a motorcycle with faulty suspension increases your risk of an accident and possible injury.**

### FRONT SUSPENSION

Check the action of the front suspension by applying the front brake and compressing the forks several times.
Check the entire assembly for signs of leaks, damage or loose fasteners.
Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.

Refer to section 12 for fork service.



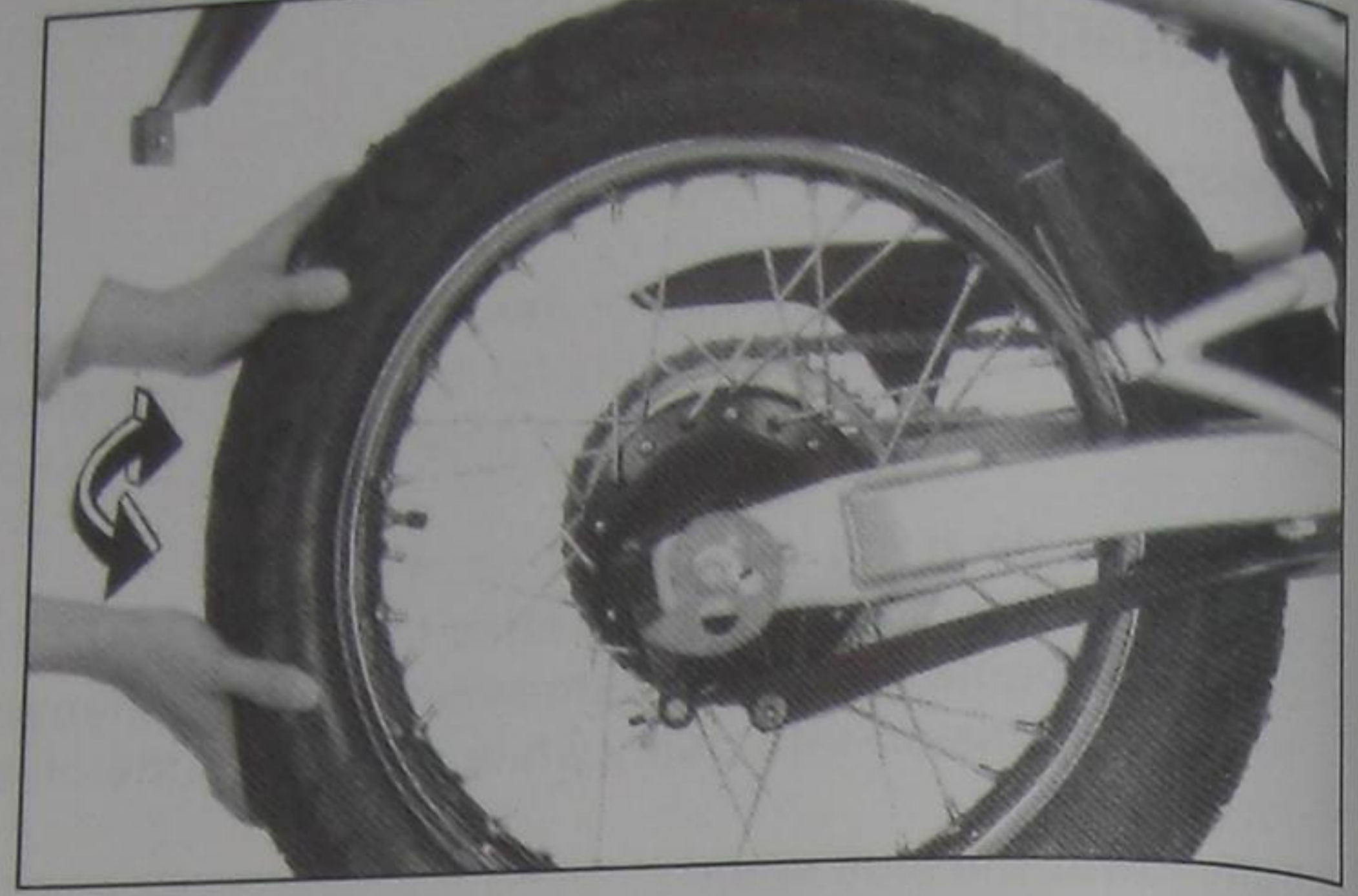
### REAR SUSPENSION

Check the action of the shock absorber by compressing it several times.
Check the entire shock absorber assembly for signs of leaks, damage or loose fasteners.
Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.

Refer to section 13 for shock absorber and linkage service.

Raise the rear wheel off the ground by placing a box or other support under the engine and support the motorcycle securely.
Check for worn swingarm bushings by grabbing the rear wheel and attempting to move the wheel side to side.
If any play is detected, check for looseness of the swingarm pivot bolt.
Alos, check the swingarm pivot bushings for wear or damage.

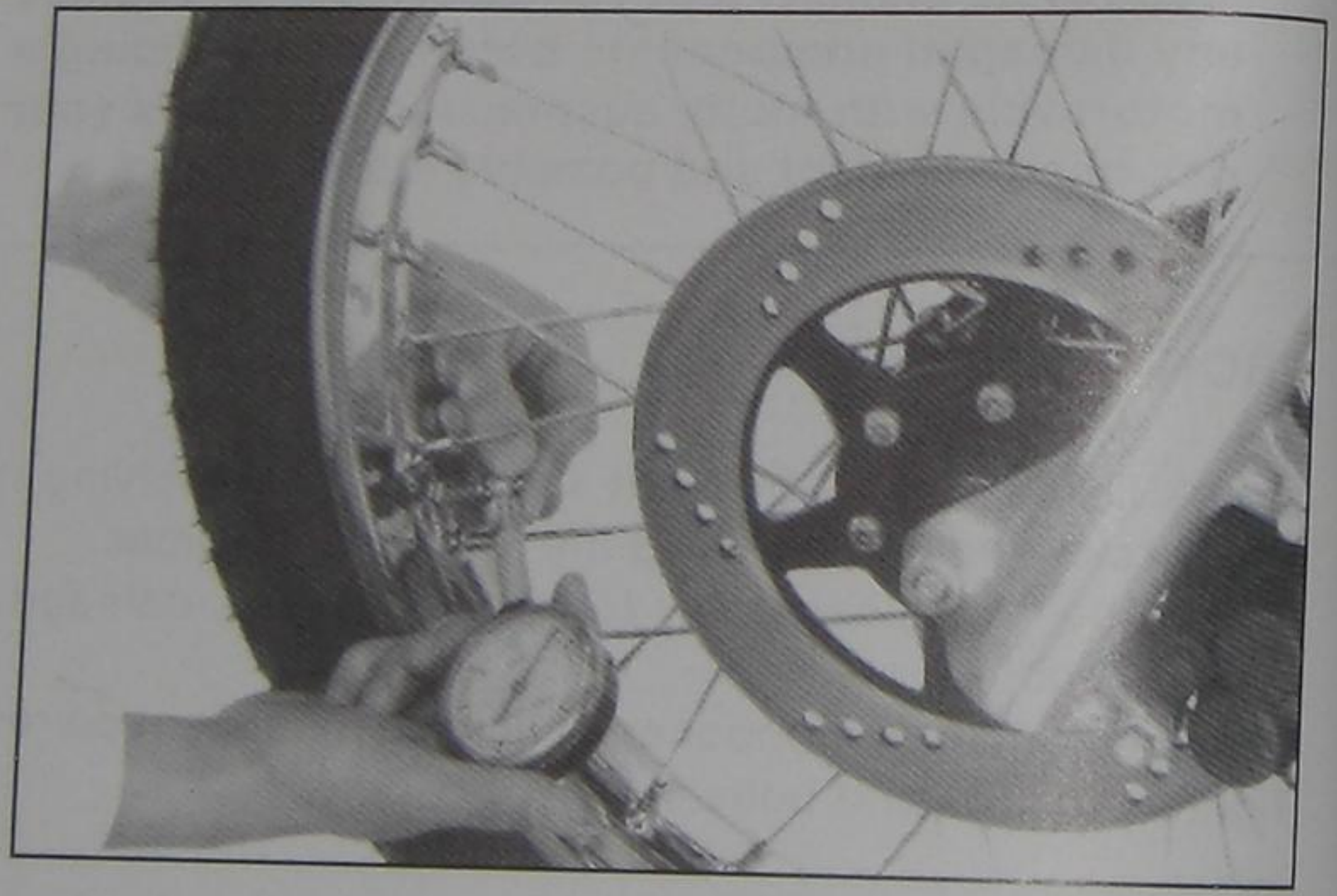
Refer to section 13 for swingarm sevice.



## Nuts, Bolts, Fasteners

Check that all chassis nuts and bolts are tightened to correct torque values (page 1-11).
Check that all cotter pin, safety clips, hose clamps and cable stays are in place and properly secured.

## Wheels / Tires



Turn the wheel and check that it rotates smoothly with no unusual noise.
If faults are found, inspect the wheel bearings.

Check the tire for cuts, embedded objects or excessive wear. Correct the tire pressure.

NOTE:

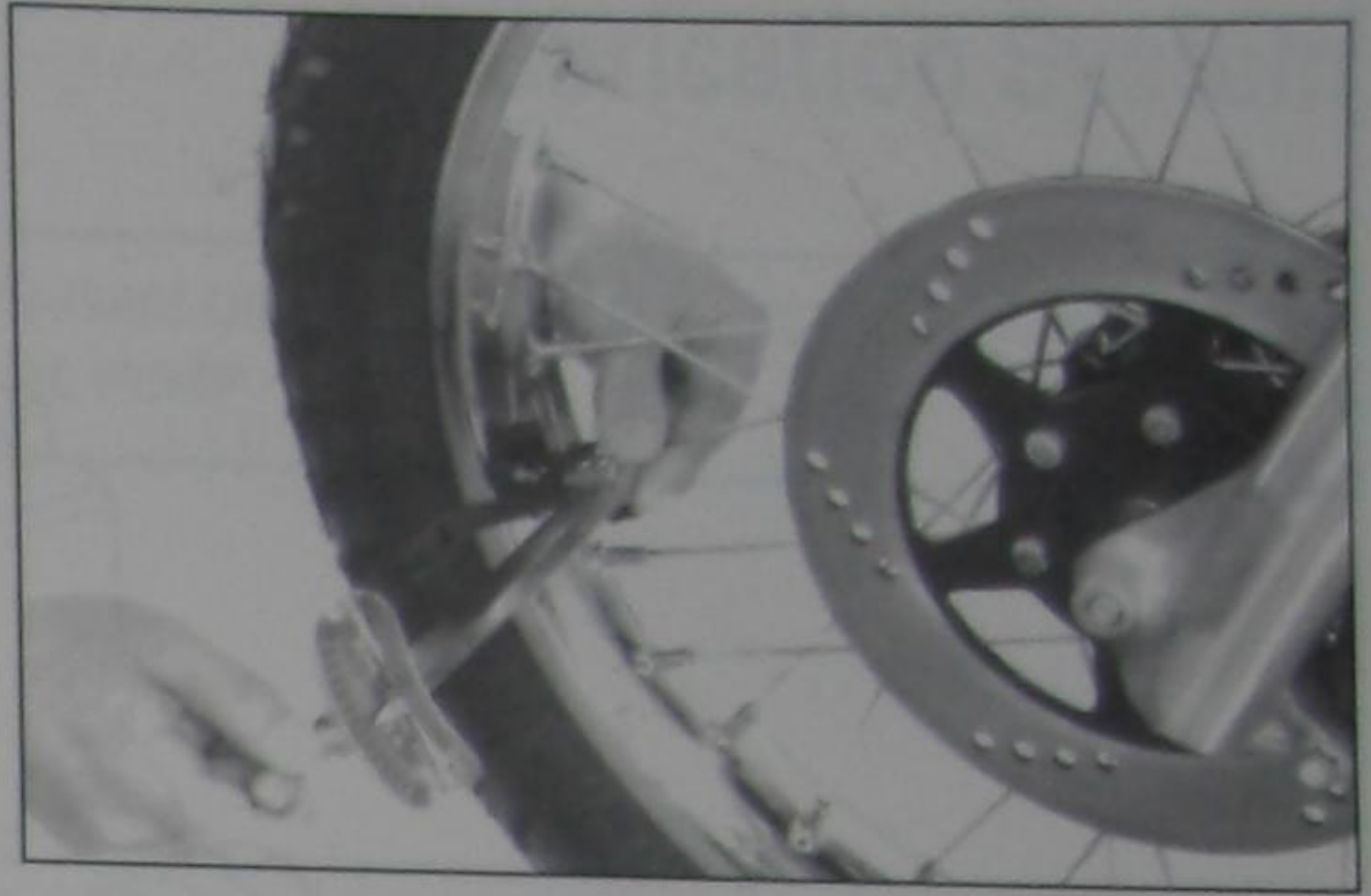
- The tire pressure should be checked when the tires are COLD.

**RECOMMENDED TIRE PRESSURE:**
**Driver only:**
**Front: 175 kPa (1.75 kg/cm², 25 psi)**
**Rear: 175 kPa (1.75 kg/cm², 25 psi)**

**Driver and passenger:**
**Front: 175 kPa (1.75 kg/cm², 25 psi)**
**Rear: 200 kPa (2.00 kg/cm², 29 psi)**

Measure the tread depth at the center of tire.
Replace the tire when the tread depth reaches the following limits:

**MINIMUM TREAD DEPTH: Front: 3.0 mm (1.2 in)**
**Rear: 3.0 mm (1.2 in)**



Inspect the spokes for looseness by tapping them with a screwdriver.
If a spoke does not sound clearly, or if it sounds different from the other spokes, tighten it.

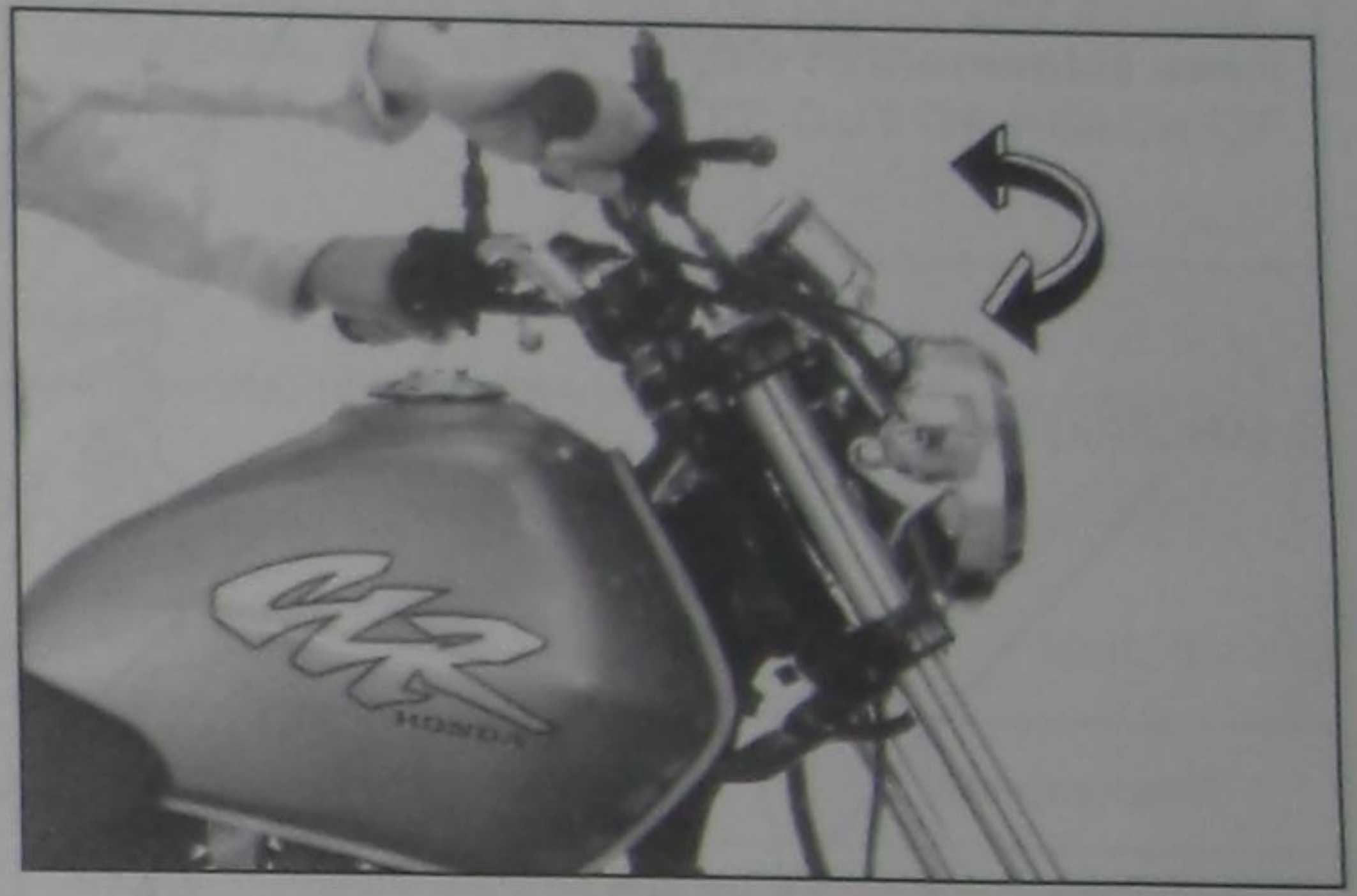
**TORQUE: Front spoke: 4 N·m (0.4 kgf-m, 2.9 lbf-ft)**
**Rear spoke: 4 N·m (0.4 kgf-m, 2.9 lbf-ft)**

NOTE:

- The spoke nipples are made of soft material. Be sure to tighten the spokes with the proper size spoke wrench. After tightening, check the rim for runout.

**TOOLS:**
**Spoke wrench, 5.8 x 6.1 mm 07701-0020300**

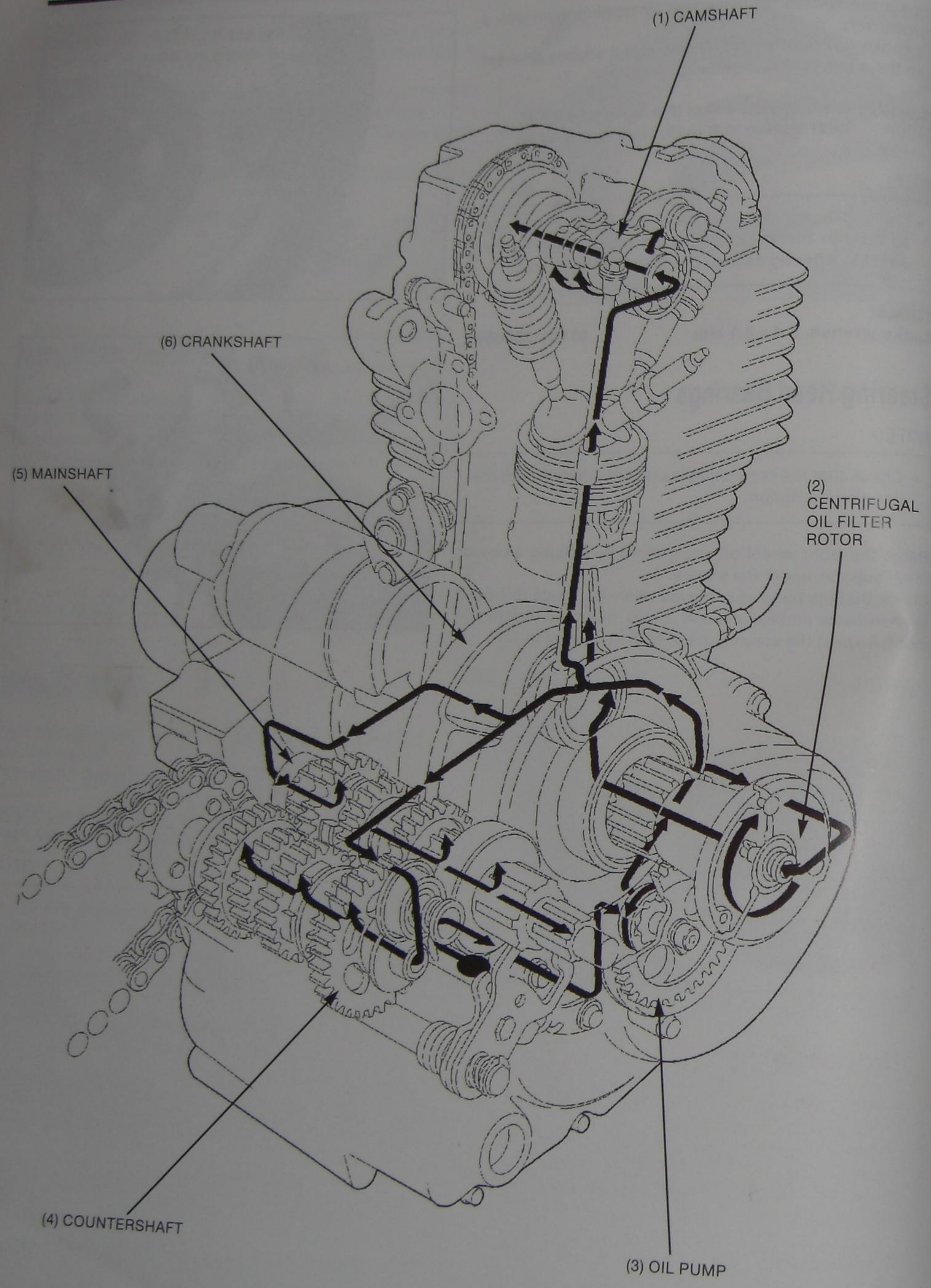
## Steering Head Bearings



NOTE:

- Check that the control cables do not interfere with the handlebar rotation.

Raise the front wheel off the ground by placing a box or other support under the engine.
Check that the handlebar moves freely from side to side. If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (section 12).



# 4. Lubrication System

| | | | |
|---|---|---|---|
| SERVICE INFORMATION | 4-1 | ENGINE OIL CENTRIFUGAL FILTER | 4-2 |
| TROUBLESHOOTING | 4-1 | OIL PUMP | 4-2 |

## Service Information

### GENERAL

⚠ **WARNING**

- **Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil. KEEP OUT OF REACH OF CHILDREN.**

- The oil pump can be serviced with the engine installed in the frame.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.
- For engine oil level check, see page 3-8.
- For engine oil strainer screen clearing, see page 3-9.

### SPECIFICATIONS

Unit: mm (in)

| Item | | Standard | Service Limit |
|---|---|---|---|
| Engine oil capacity | At draining | 1.0 liter (1.06 US qt, 0.88 Imp qt) | — |
| | At disassembly | 1.2 liters (1.27 US qt, 1.06 Imp qt) | — |
| Recommended engine oil | | Honda 4-stroke oil or equivalent motor oil<br>API service classification: SE<br>Viscosity: SAE 10W-30 | — |
| Oil pump | Tip clearance | 0.15 (0.006) | 0.20 (0.008) |
| | Body clearance | 0.15-0.21 (0.006-0.008) | 0.35 (0.014) |
| | Side clearance | 0.03-0.12 (0.001-0.005) | 0.15 (0.006) |

### TORQUE VALUES

| | |
|---|---|
| Oil filter rotor cover screw | 5 N·m (0.5 kgf-m, 3.6 lbf-ft) |
| Pump plate attaching screw | 3 N·m (0.3 kgf-m, 2.2 lbf-ft) |
| Oil pump mounting screw | 10 N·m (1.0 kgf-m, 7 lbf-ft) |

## Troubleshooting

**Oil level too low**
- Normal oil consumption
- External oil leaks
- Worn valve guide or seal
- Worn piston rings or incorrect piston ring installation
- Worn cylinder.

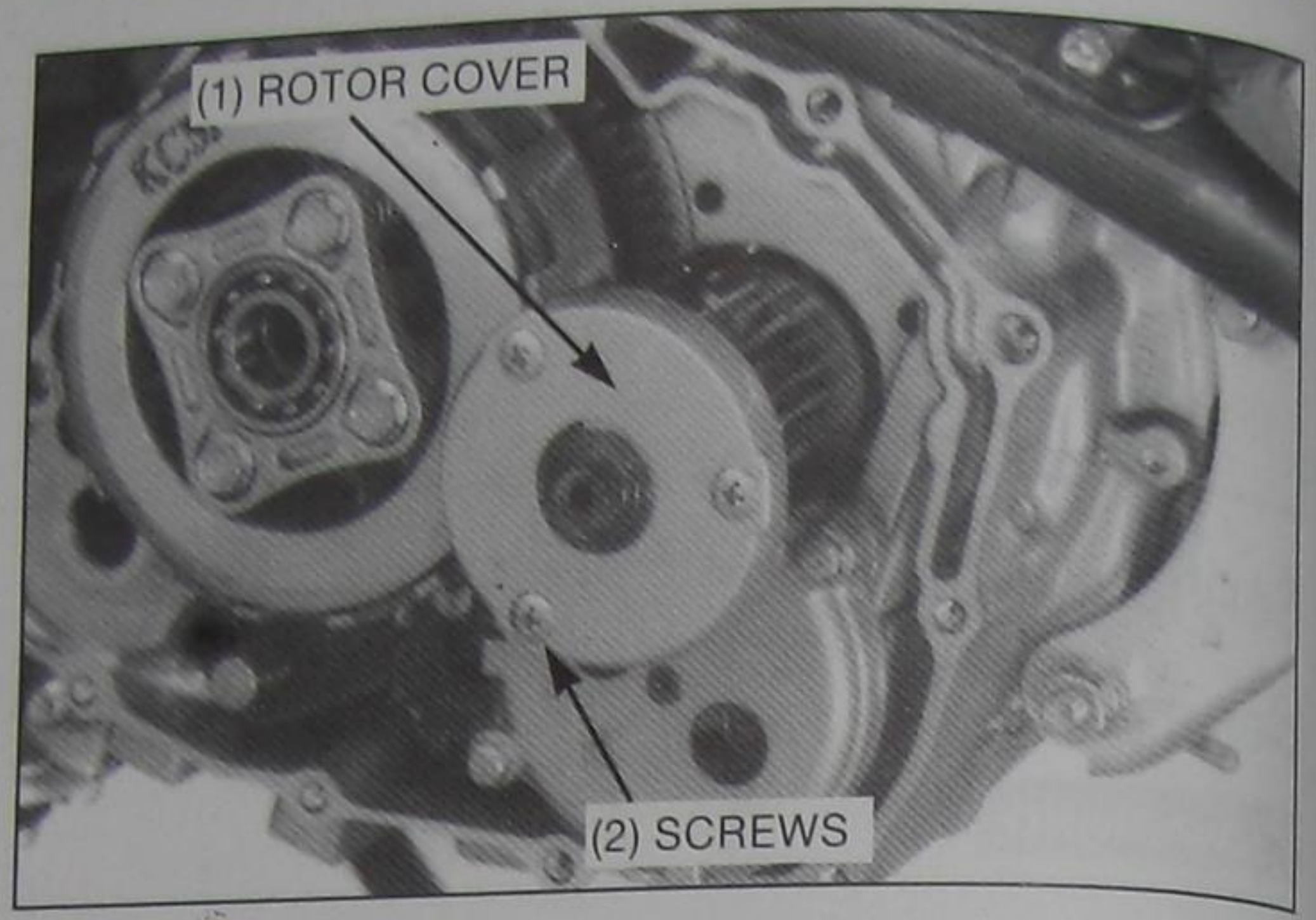
**Oil contamination**
- Oil not changed often enough
- Faulty cylinder head gasket
- Worn piston rings.

## Engine Oil Centrifugal Filter

### CLEANING

Remove the right crankcase cover (page 9-3).

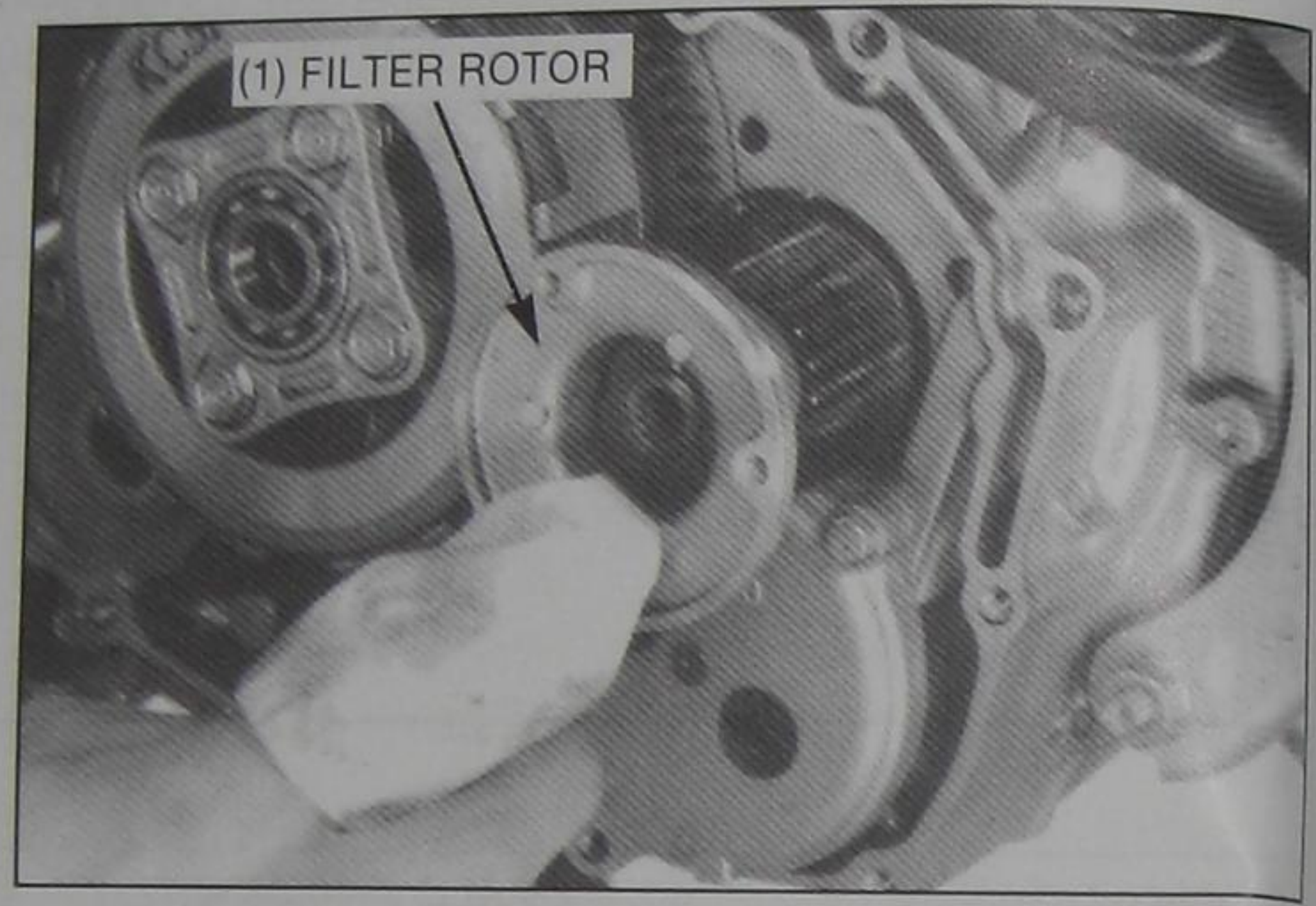
Remove the three screws and the oil filter rotor cover.


(1) ROTOR COVER
(2) SCREWS

Clean the oil filter rotor cover and the inside of the oil filter rotor using a clean lint-free cloth.

**CAUTION**

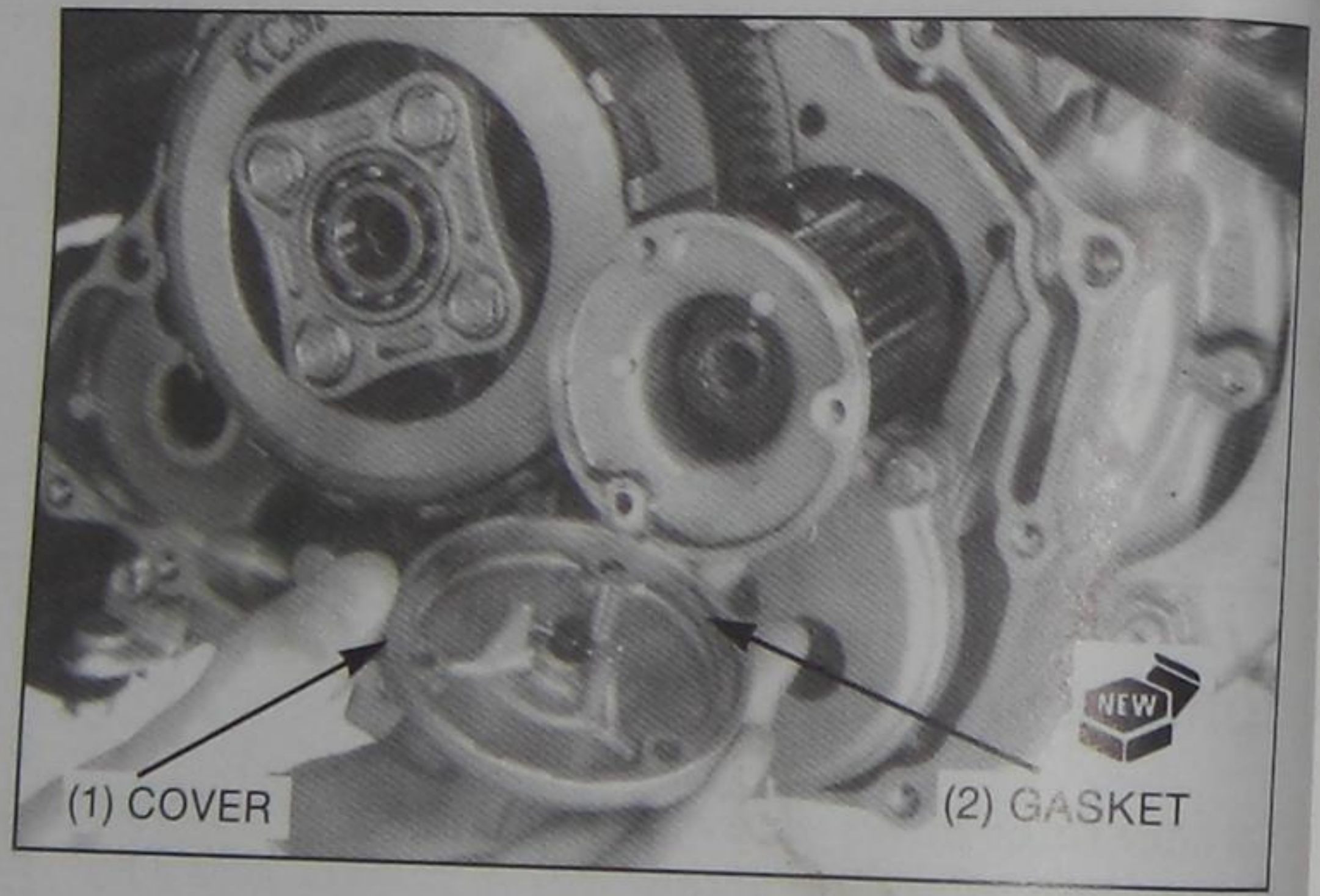
- **Do not allow dust or dirt to enter the crankshaft oil passage.**
- **Do not use compressed air to clean the filter rotor.**


(1) FILTER ROTOR

Install the oil filter rotor cover with a new gasket, aligning the screw holes in the cover and gasket.
Install the three screws and tighten them.

**TORQUE: 5 N·m (0.5 kgf-m, 3.6 lbf-ft)**

Install the right crankcase cover (page 9-12).

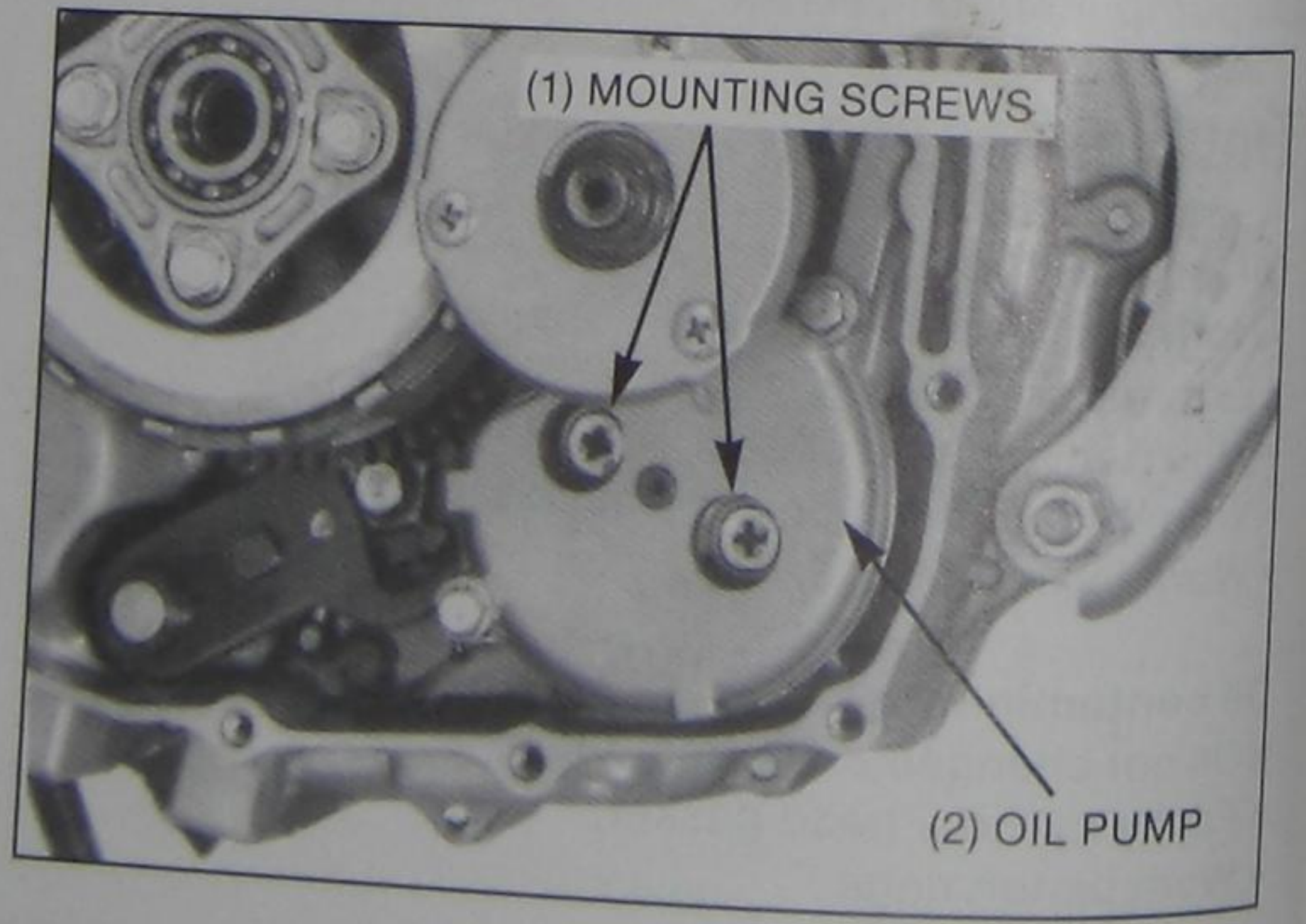

(1) COVER
(2) GASKET
NEW

## Oil Pump

### REMOVAL

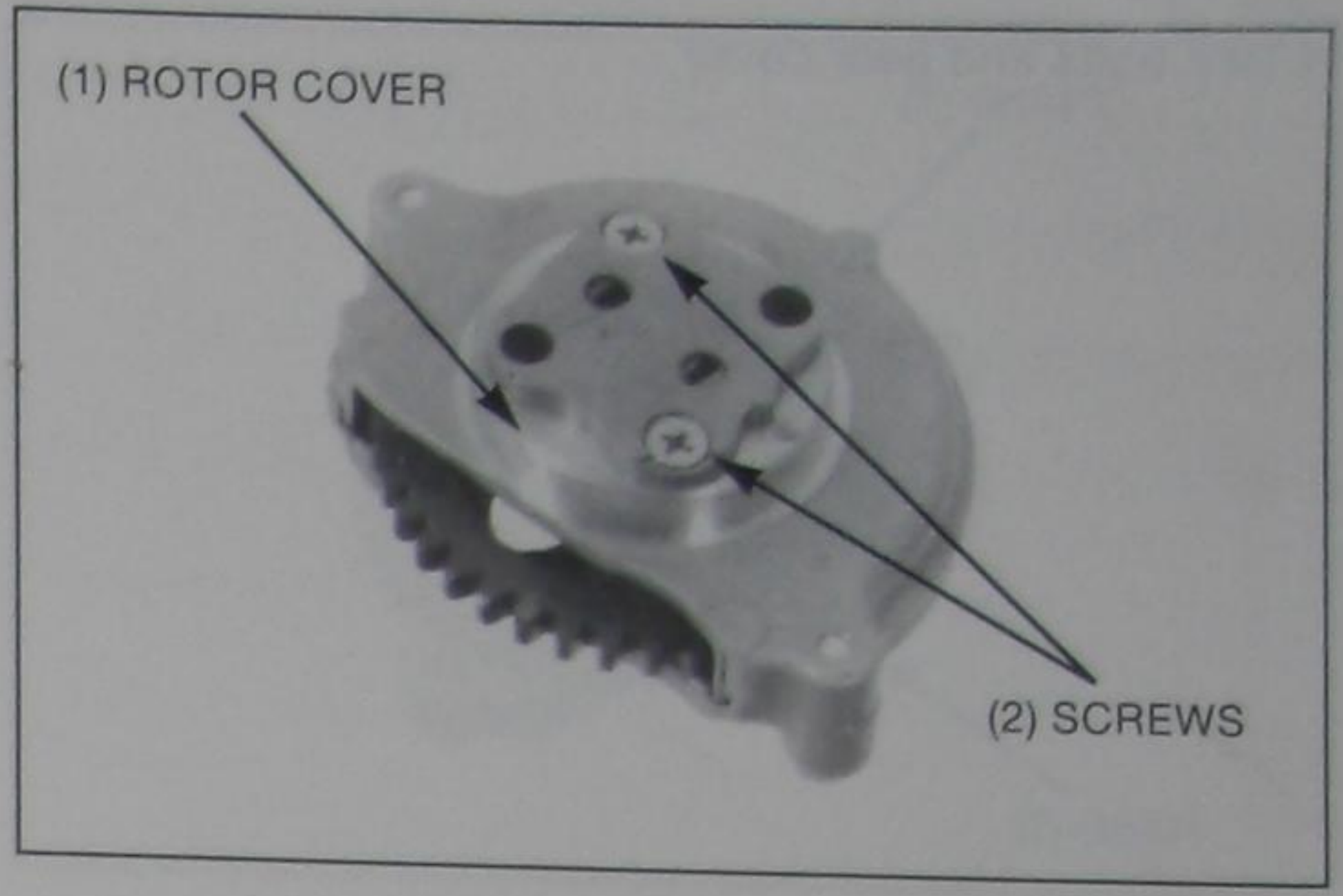
Remove the right crankcase cover (page 9-3).

Rotate the crankshaft clockwise until the pump mounting screws and accessible through the pump gear.
Remove the two mounting screws and the oil pump.


(1) MOUNTING SCREWS
(2) OIL PUMP

### INSPECTION

Remove the two screws and the rotor cover.

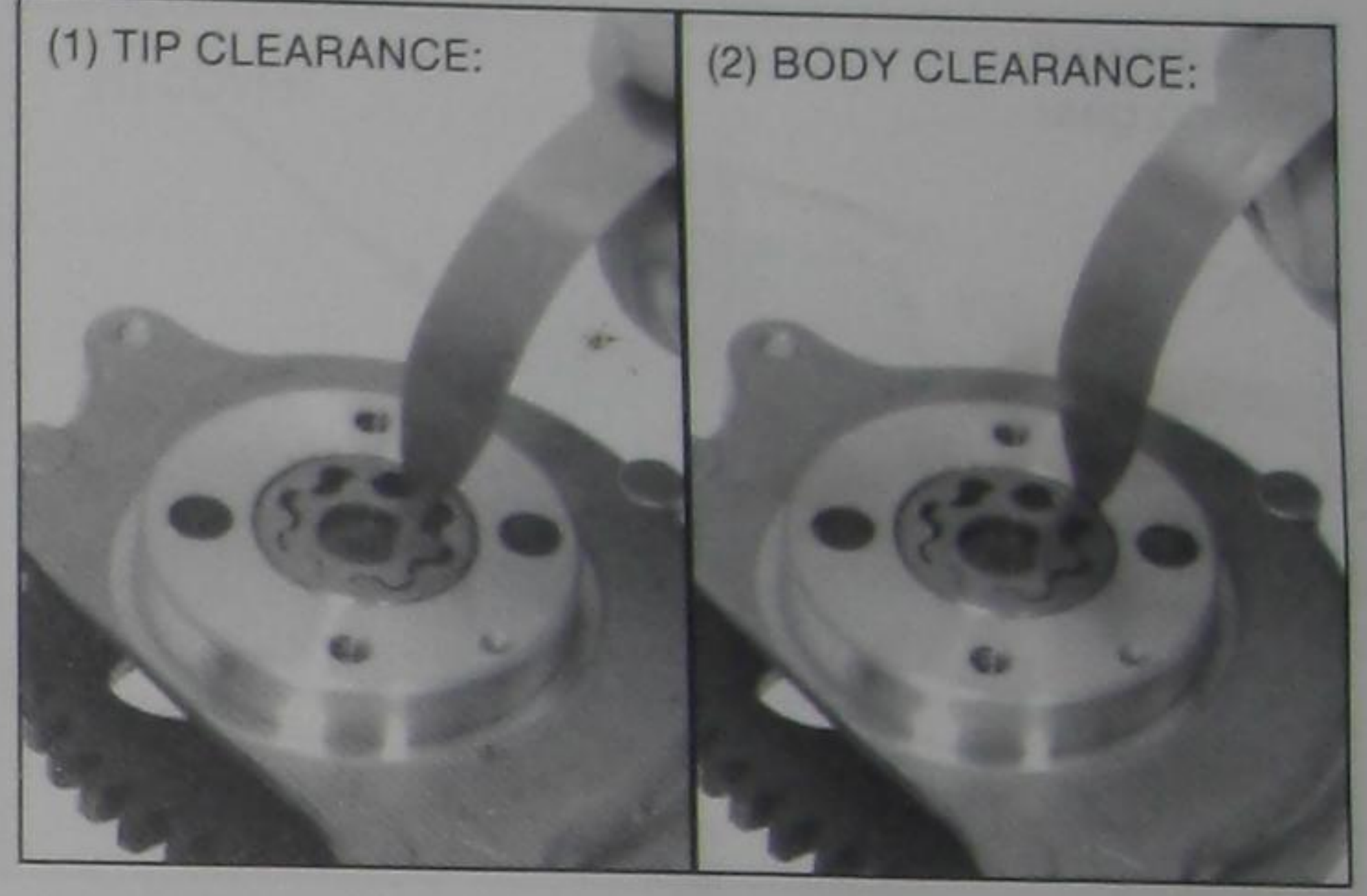

(1) ROTOR COVER
(2) SCREWS

Measure the rotor tip clearance.

**SERVICE LIMIT: 0.20 mm (0.008 in)**

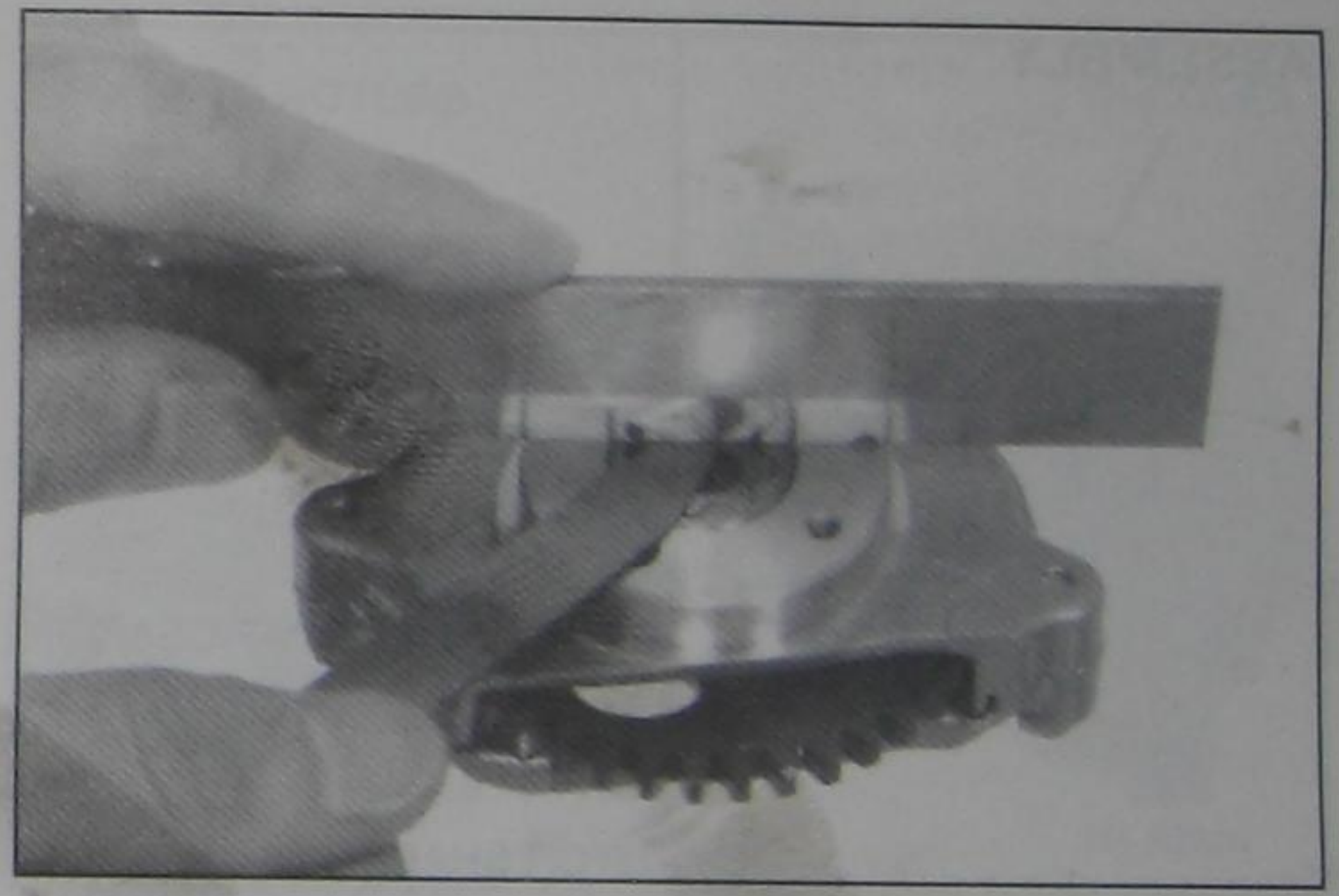
Measure the pump body clearance

**SERVICE LIMIT: 0.35 mm (0.014 in)**


(1) TIP CLEARANCE:
(2) BODY CLEARANCE:

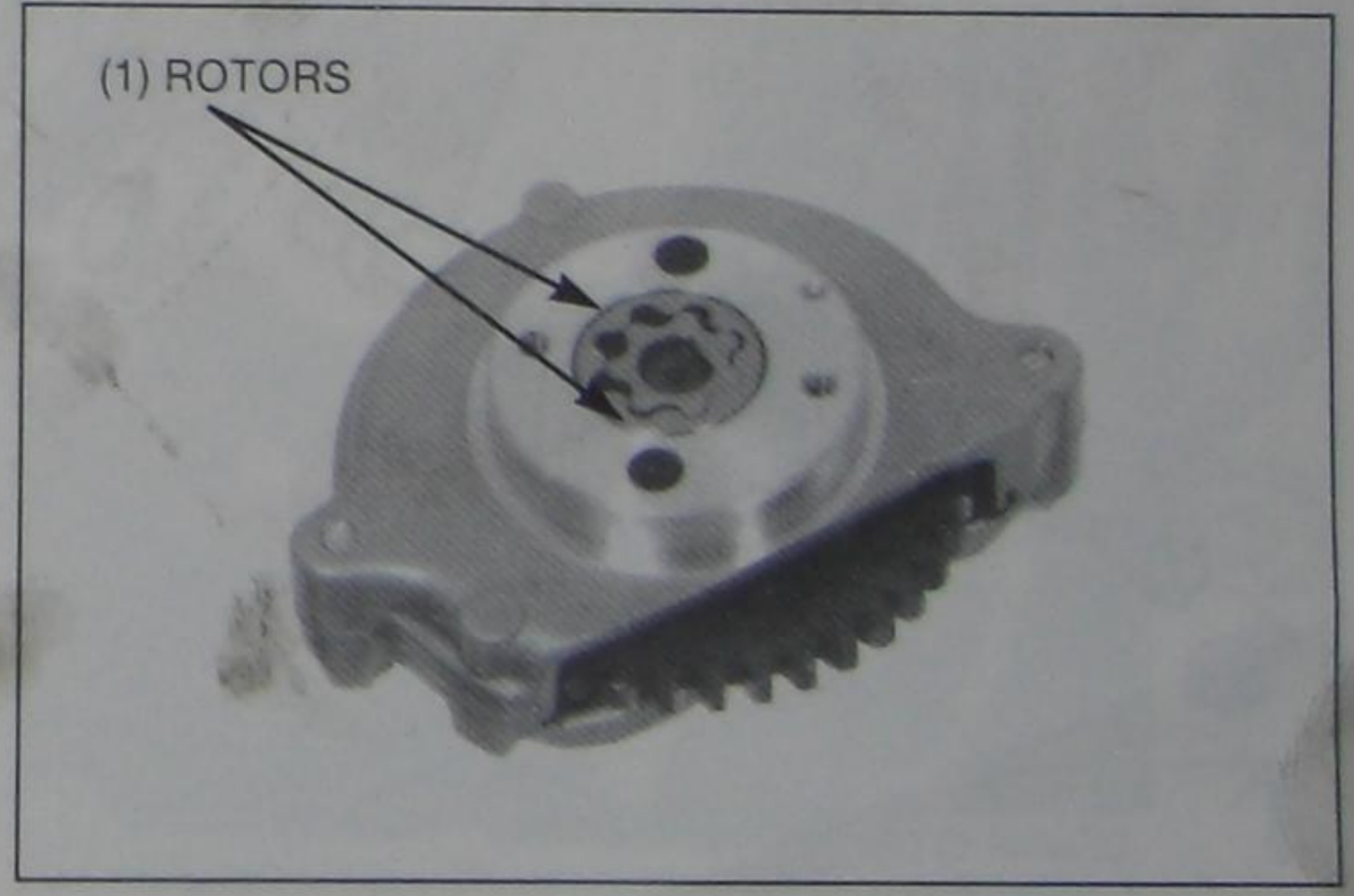
Measure the pump side clearance.

**SERVICE LIMIT: 0.15 mm (0.006 in)**

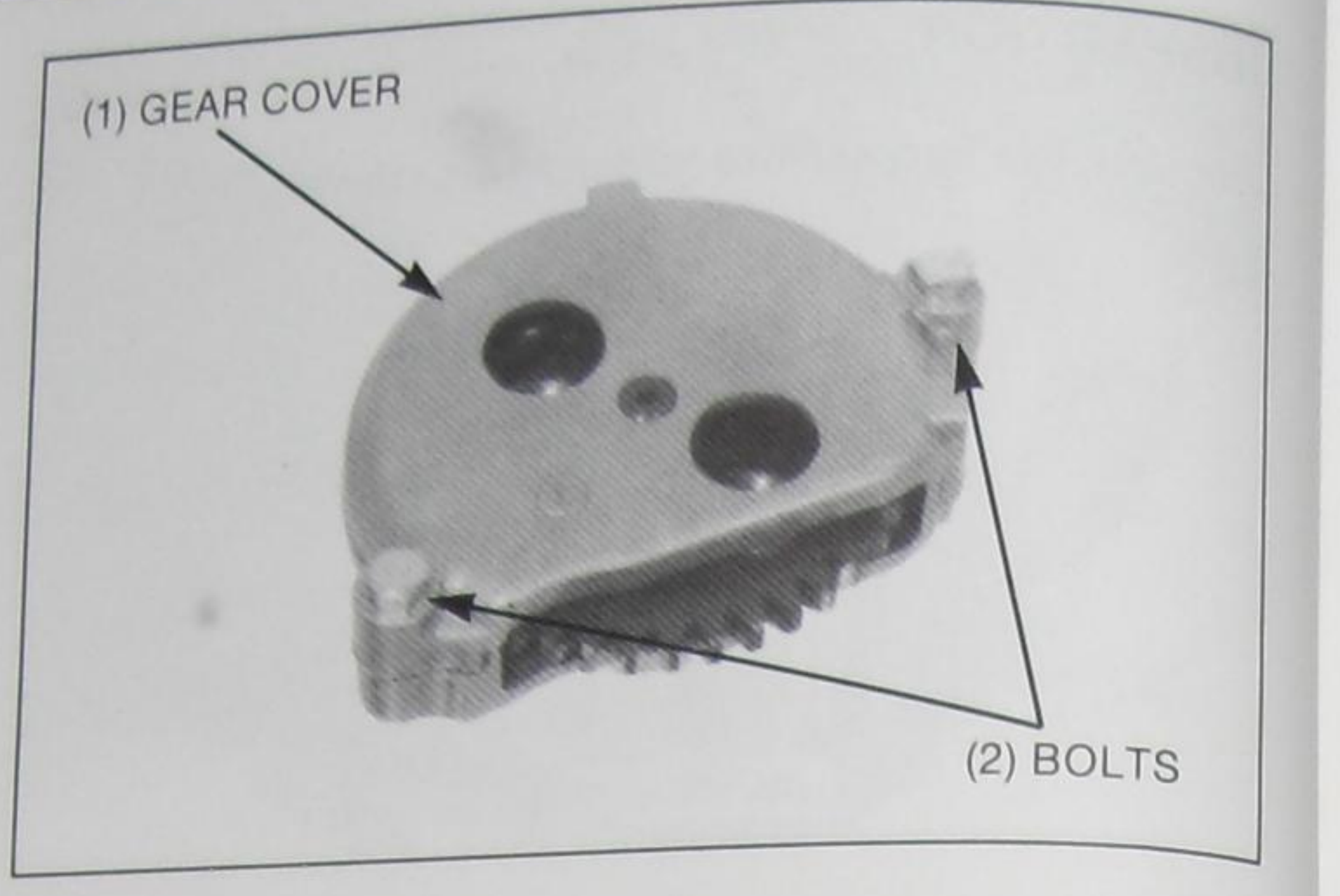


### DISASSEMBLY

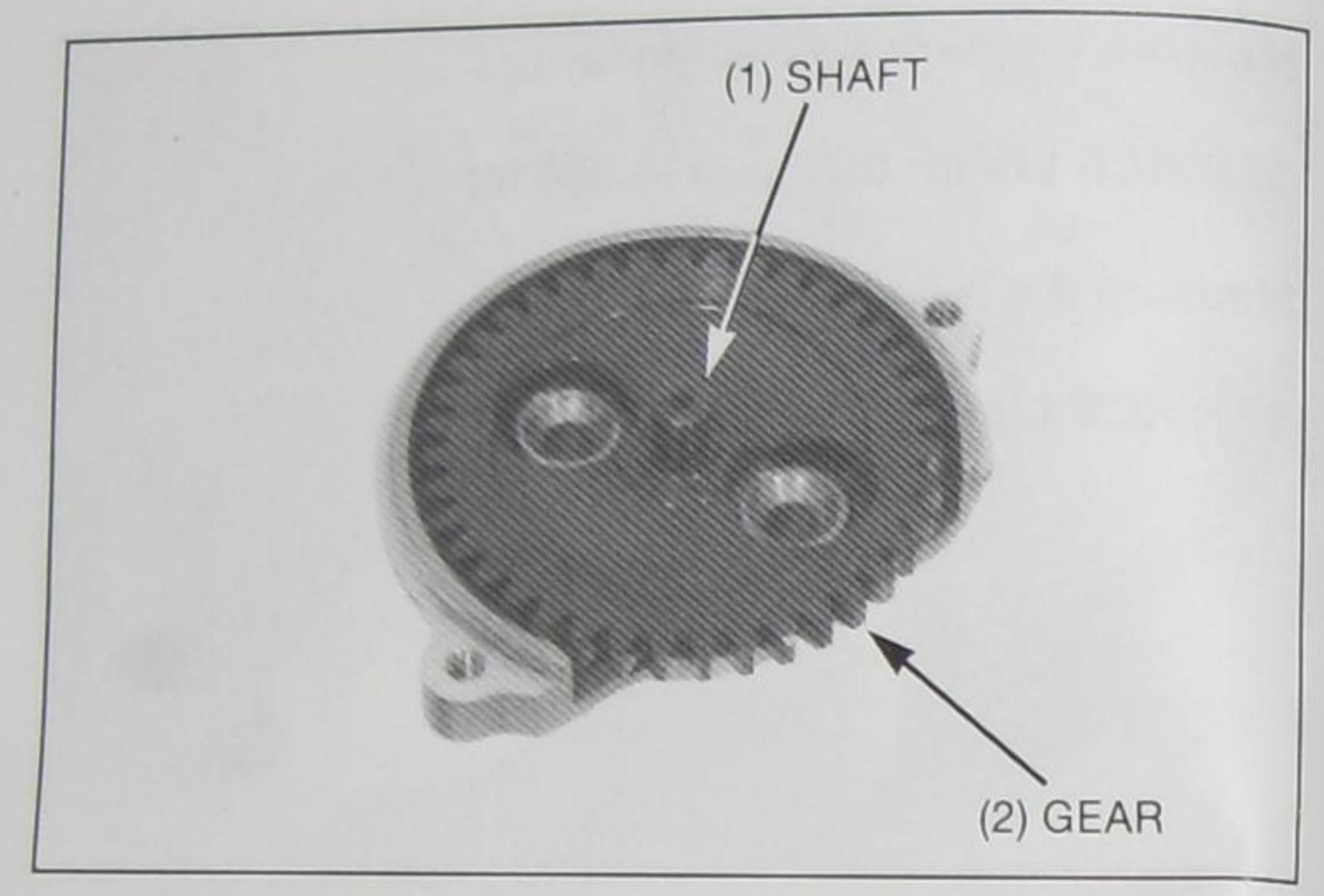
Remove the following:
- Two screws and rotor cover
- Inner and outer rotors



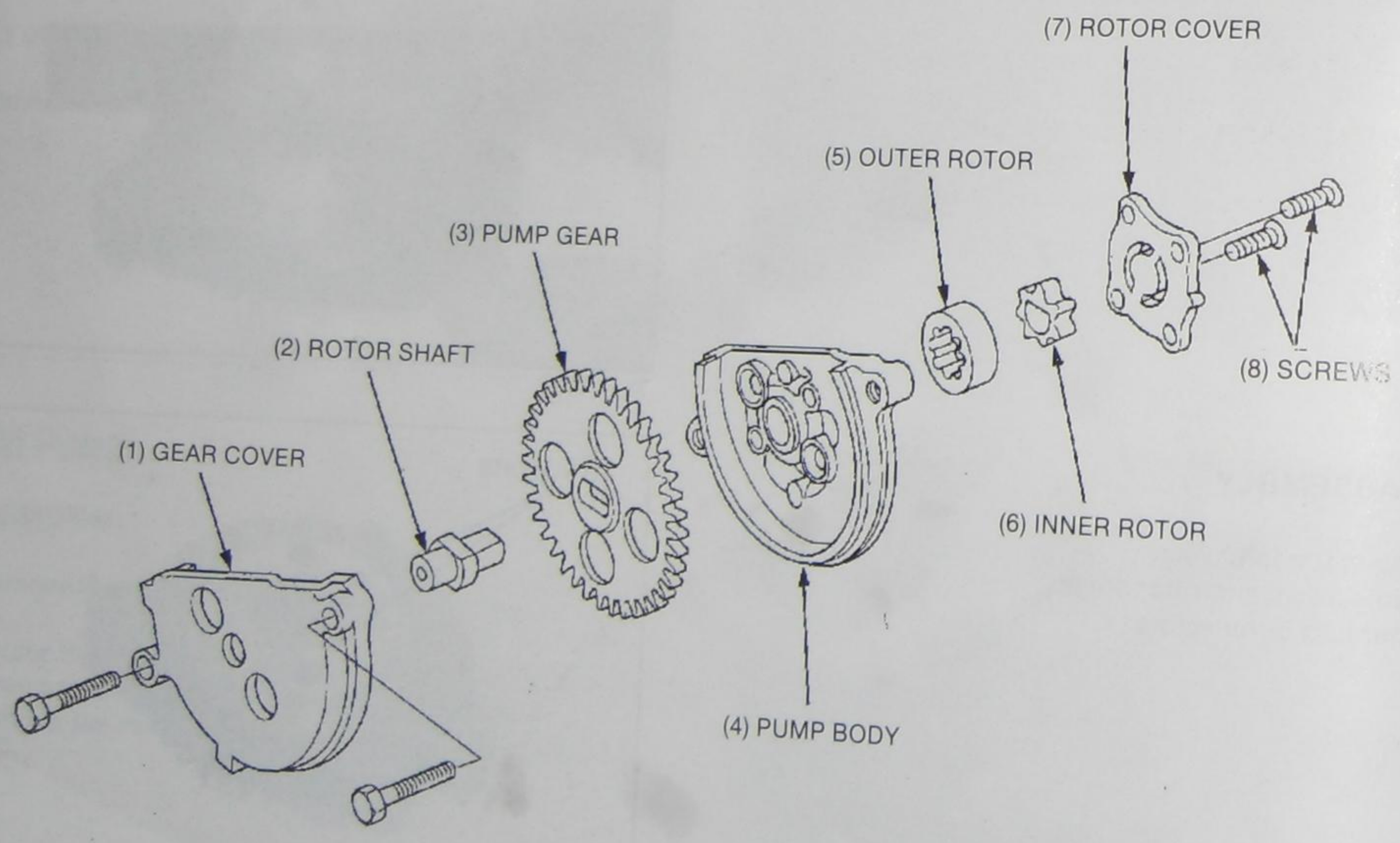
- Two bolts and gear cover


(1) GEAR COVER
(2) BOLTS

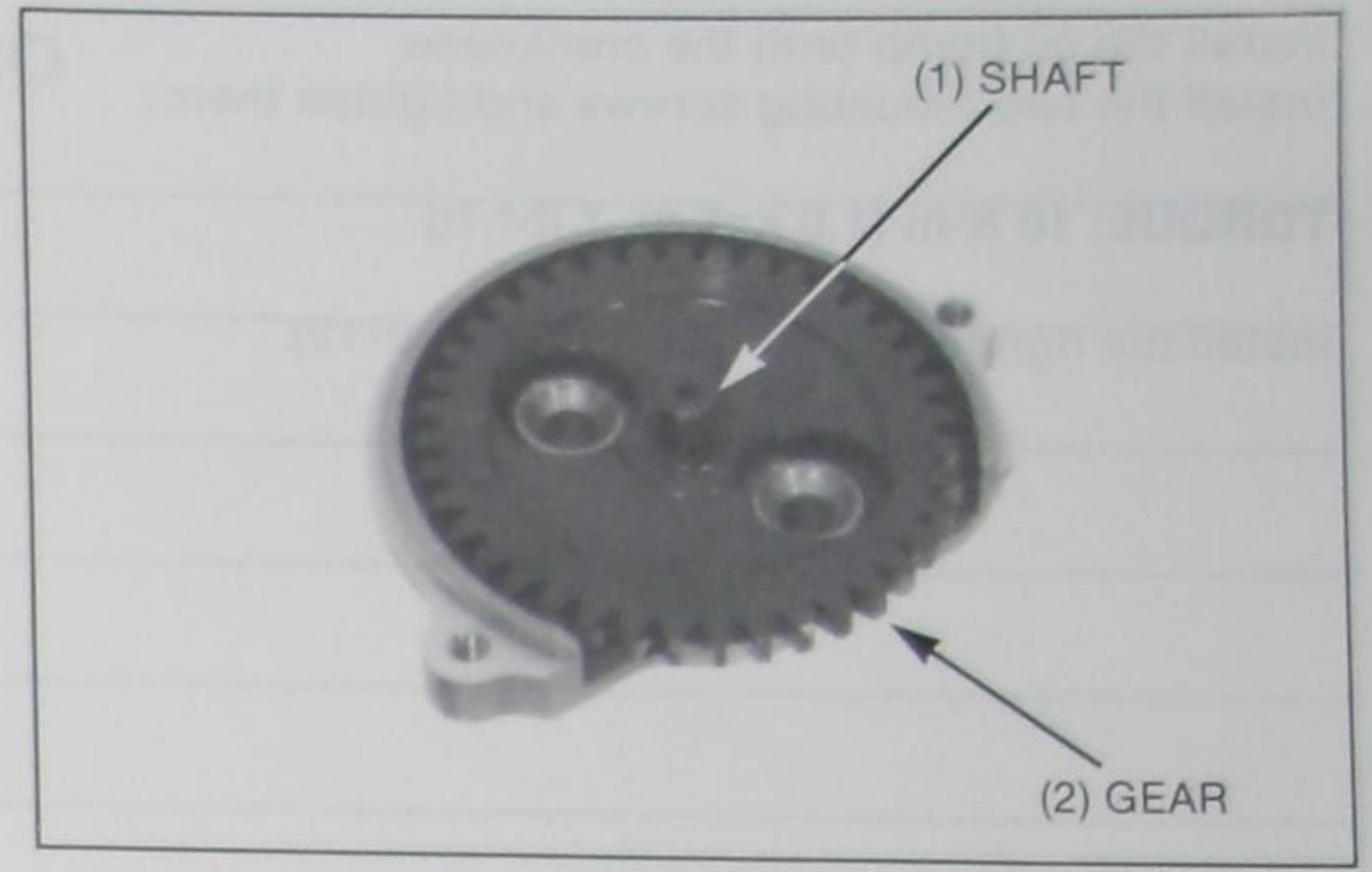
- Rotor shaft
- Pump gear


(1) SHAFT
(2) GEAR

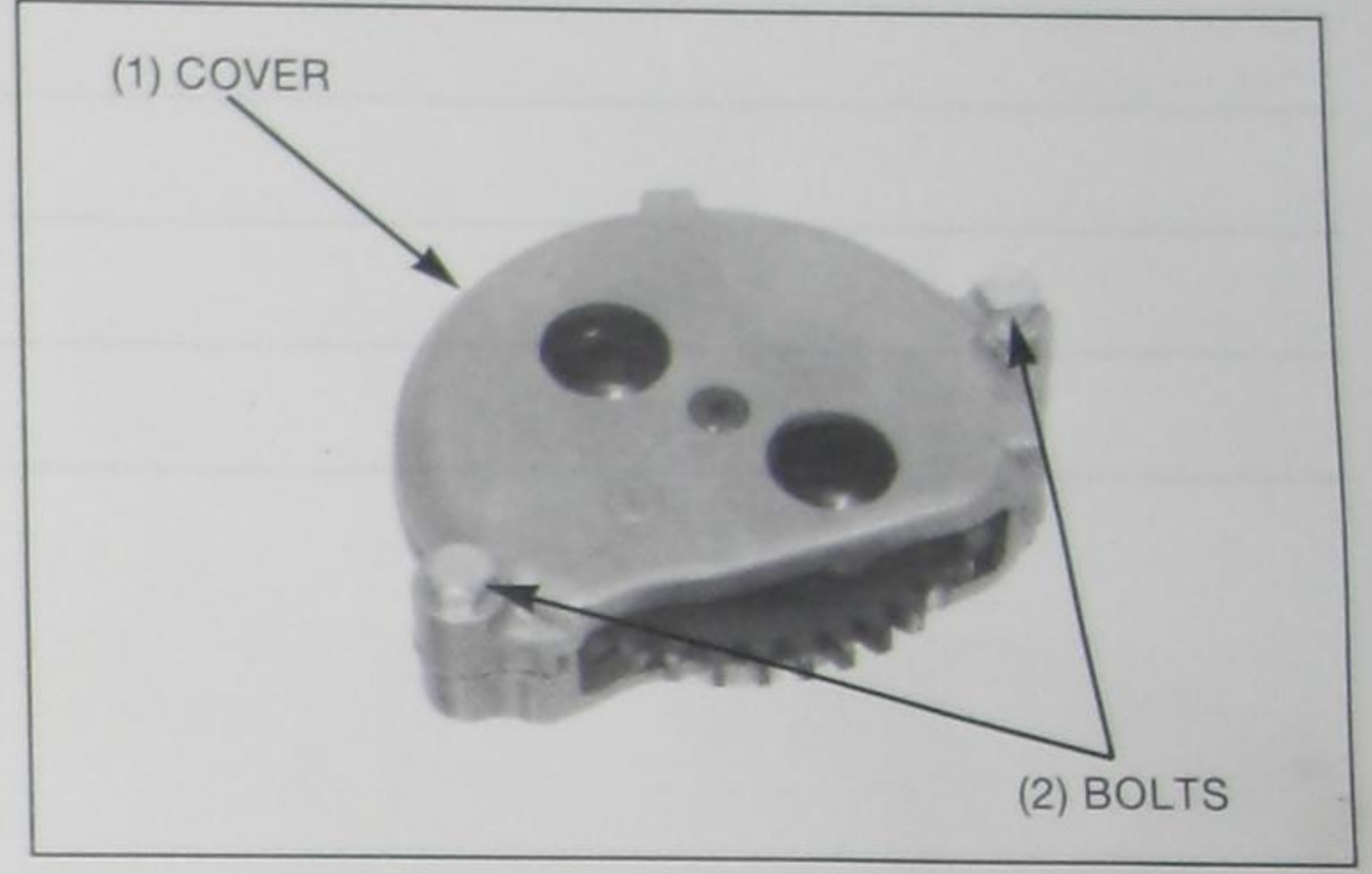
## ASSEMBLY


(7) ROTOR COVER
(5) OUTER ROTOR
(3) PUMP GEAR
(2) ROTOR SHAFT
(8) SCREWS
(1) GEAR COVER
(6) INNER ROTOR
(4) PUMP BODY

Install the rotor shaft and pump gear into the pump body as shown.


(1) SHAFT
(2) GEAR

Install the gear cover and tighten the bolts.

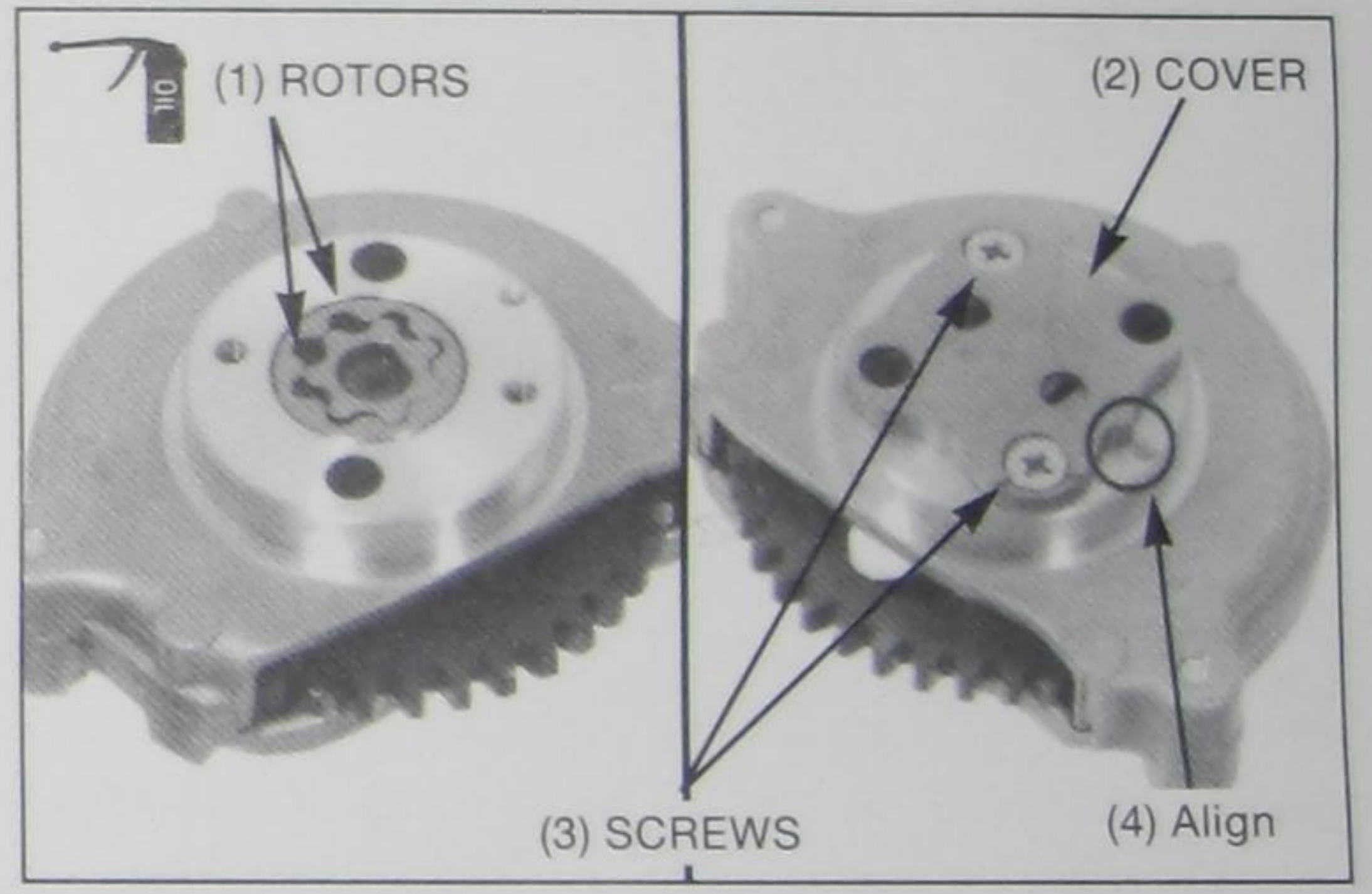

(1) COVER
(2) BOLTS

Apply oil to outer and inner rotors and install them.

Install the rotor cover, aligning its boss with the dent in the pump body.
Install the cover attaching screws and tighten them.

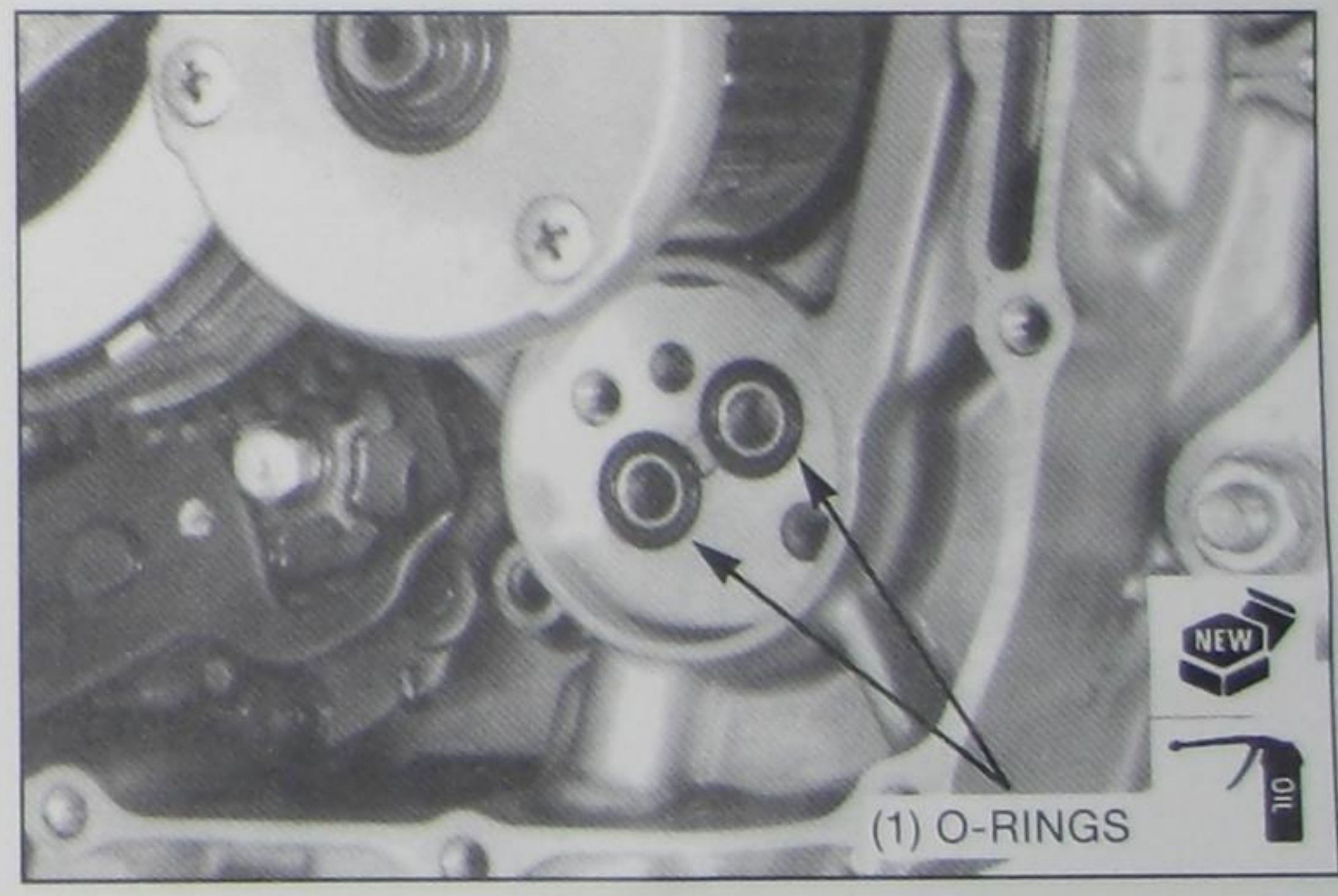
**TORQUE: 3 N·m (0.3 kgf-m, 2.2 lbf-ft)**

Check that the oil pump rotates smoothly.


(1) ROTORS
(2) COVER
(3) SCREWS
(4) Align

## INSTALLATION

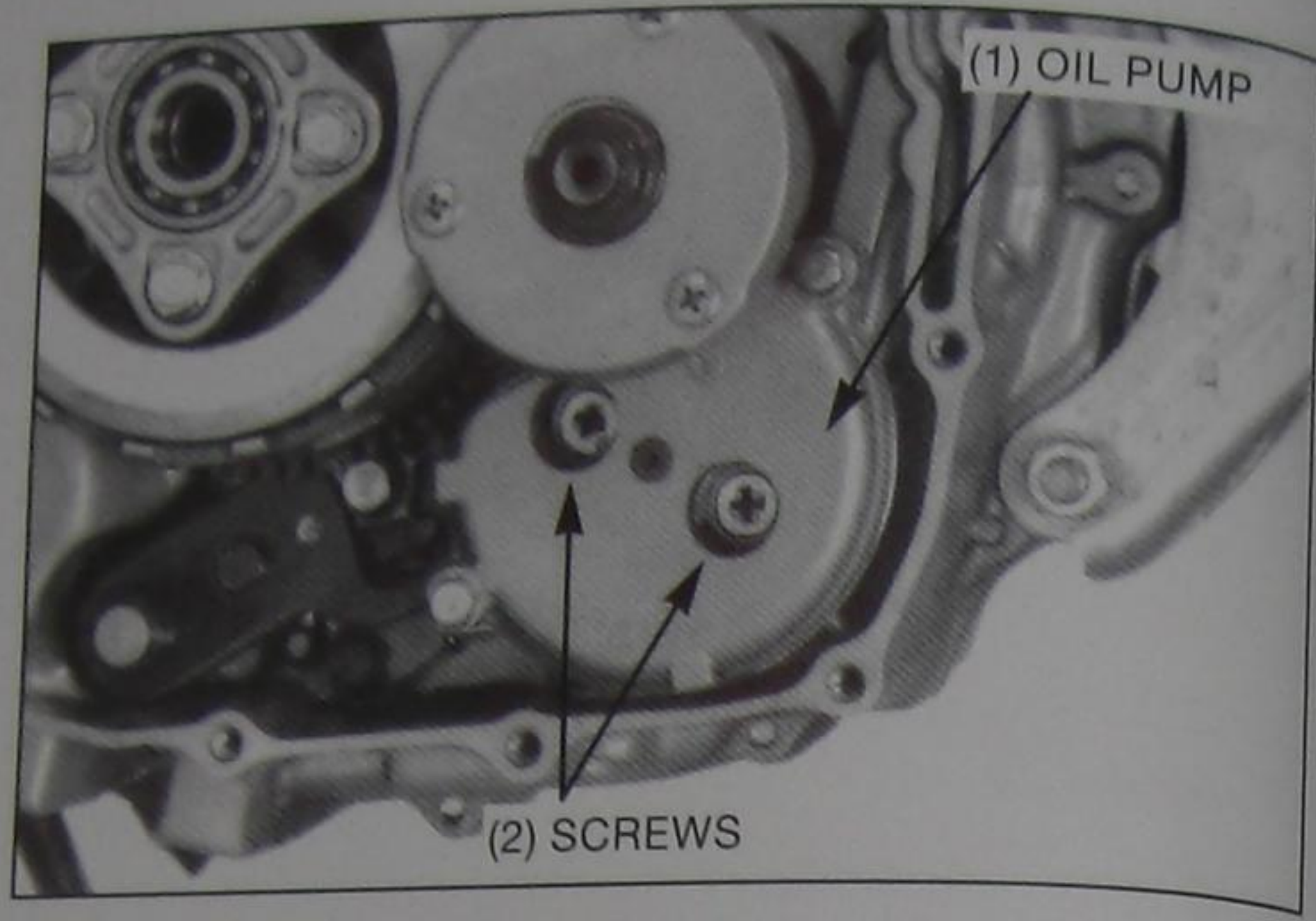
Coat new O-rings with oil install them into the crankcase grooves.


NEW
(1) O-RINGS

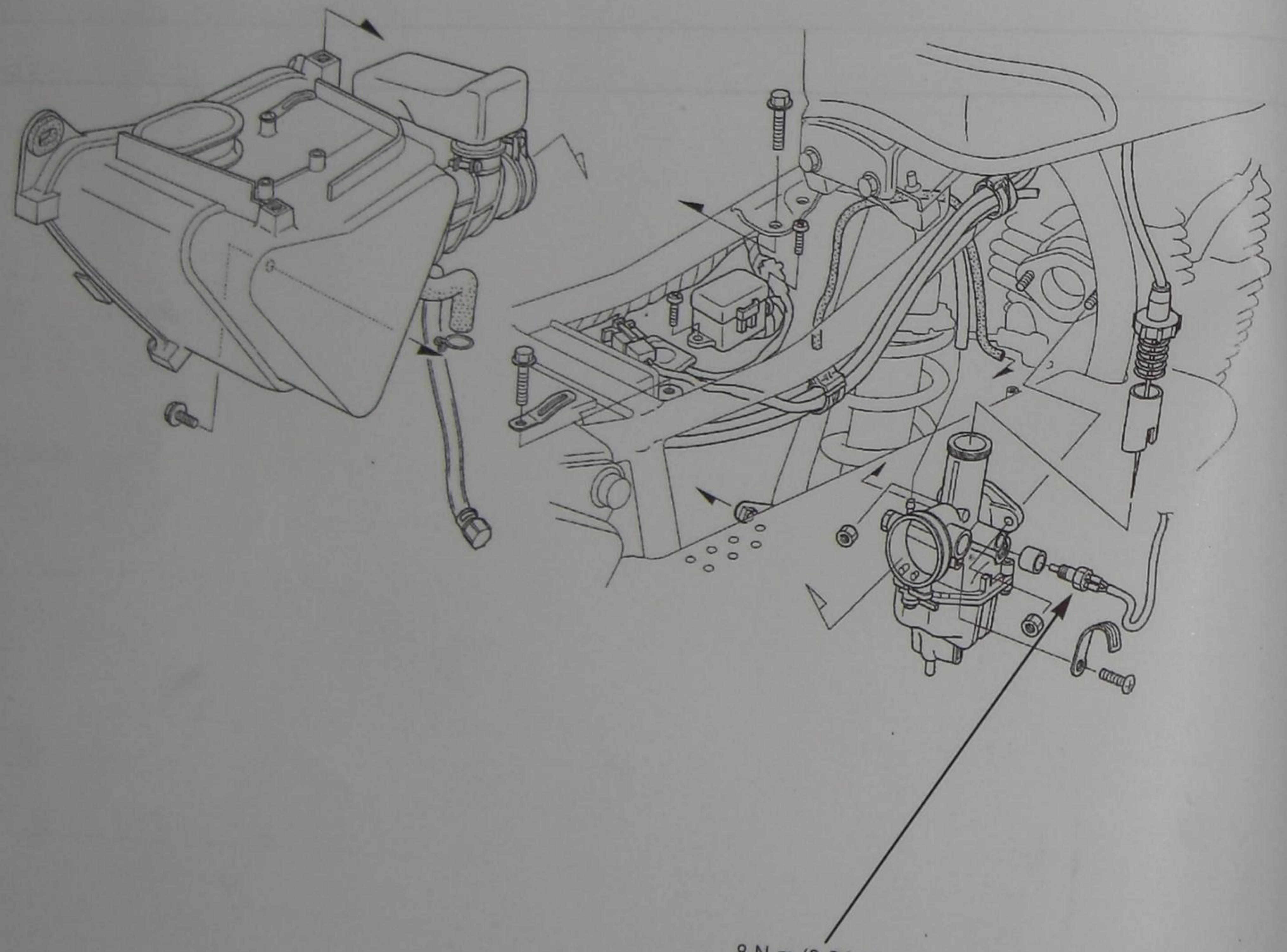
Install the oil pump onto the crankcase.
Install the two mounting screws and tighten them.

**TORQUE: 10 N·m (1.0 kgf-m, 7 lbf-ft)**

Install the right crankcase cover (page 9-12).



## MEMO



# 5. Fuel System

SERVICE INFORMATION 5-1
TROUBLESHOOTING 5-2
CARBURETOR REMOVAL 5-3
CARBURETOR DISASSEMBLY/INSPECTION 5-3
CARBURETOR ASSEMBLY 5-6
CARBURETOR INSTALLATION 5-8
PILOT SCREW ADJUSTMENT 5-9
AIR CLEANER HOUSING 5-10

## Service Information

### GENERAL

⚠ **WARNING**

- **Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.**
- **If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.**
- **Bending or twisting the control cable will impair smooth operation and could cause the cable to stick or bind, resulting in loss of vehicle control.**

- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.

**CAUTION**

- **Be sure to remove the diaphragms before cleaning air and fuel passages with compressed air. The diaphragms might be damaged.**

- Refer to section 2 for fuel tank removal and installation.
- Refer to section 18 for carburetor heater inspection.
- After removing the carburetor, cover the intake ports of the cylinder heads with shop towels to prevent any foreign material from dropping into the engine.
- Before disassembling the carburetors, place an approved fuel container under the carburetors, loosen the drain screw and drain the carburetor.
- When disassembling the fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.

NOTE:

- If the vehicle is to be stored for more than one month, drain the float bowl. Fuel left in the float bowl may cause clogged jets, resulting in hard starting or poor driveability.

### SPECIFICATIONS

| Item | Specifications |
|---|---|
| Identification number | PDC5B |
| Venturi diameter | 22 mm (87 in) |
| Main jet | #100 |
| Slow jet | #38 x #38 |
| Jet needle clip position | 3rd groove |
| Float level | 14 mm (0.55 in) |
| Pilot screw initial opening | 1 — 1/2 turns out |
| Idle speed | 1,400 ± 100 $\text{min}^{-1}$ (rpm) |
| Throttle grip free play | 2-8 mm (1/12-1/4 in) |

**TORQUE VALUES**

| | |
|---|---|
| Carburetor heater | 8 N·m (0.8 kgf-m, 5.8 lbf-ft) |

**TOOL**

| | |
|---|---|
| Float level gauge | 07401-0010000 |
| Pilot screw wrench | 07908-4220201 |

## Troubleshooting

**Engine cranks but won't start.**
- No fuel in tank
- No fuel to carburetor
  - Clogged fuel strainer
  - Clogged fuel line
  - Clogged fuel tank breather
- Too much fuel getting to the engine
  - Clogged air cleaner
  - Flooded carburetor
- Intake air leak
- Contaminated/deteriorated fuel
- Improper choke operation
- Improper throttle operation
- No spark at plug (faulty ignition system section 16)

**Lean mixture**
- Clogged fuel jets
- Faulty float valve
- Float level too low
- Restricted fuel line
- Clogged carburetor air vent tube
- Clogged fuel tank breather
- Intake air leak

**Rich mixture**
- Choke valve closed
- Clogged air jets
- Faulty float valve
- Float level too high
- Dirty air cleaner

**Engine stalls, hard to start, rough idling**
- Restricted fuel line
- Fuel mixture too lean/rich
- Contaminated/deteriorated fuel
- Intake air leak
- Misadjusted idle speed
- Misadjusted pilot screw
- Clogged fuel tank breather
- Clogged air cleaner
- Clogged slow circuit
- Faulty ignition system (section 16)

**Afterburn when engine braking is used**
- Lean mixture in slow circuit
- Faulty ignition system (section 16)

**Backfiring or misfiring during acceleration**
- Fuel mixture too lean
- Faulty ignition system (section 16)

**Pool performance (driveability) and poor fuel economy**
- Clogged fuel system
- Faulty ignition system (section 16)

## Carburetor Removal

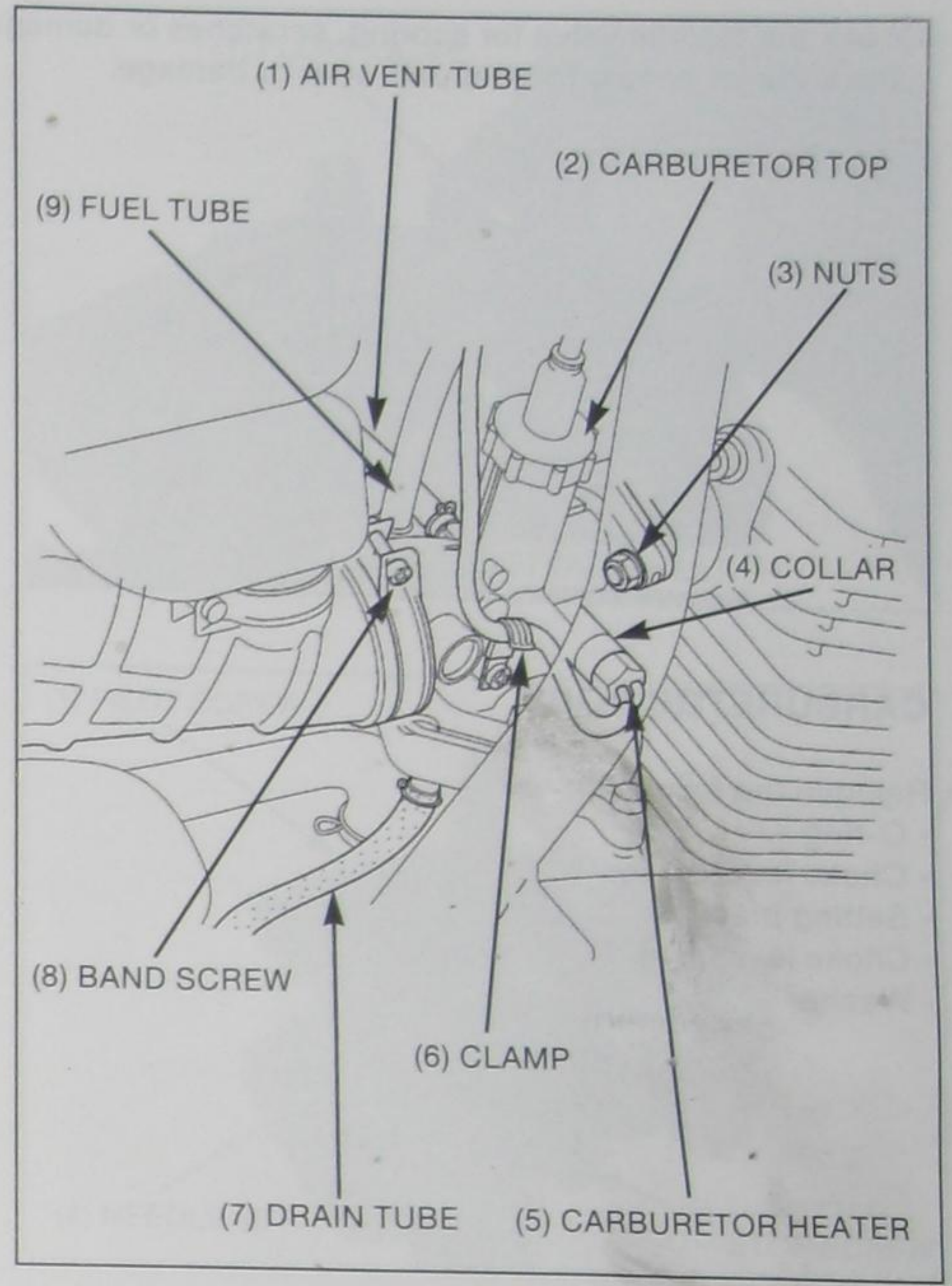
Turn the fuel valve OFF
Loosen the drain screw and drain the fuel from the float chamber into the approved gasoline container.

Remove the seat (page 2-2).

Loosen and remove the carburetor top.
Remove the throttle valve from the carburetor body, being careful not to damage the jet needle.

Disconnect the fuel tube, air vent tube and drain tube from the carburetor body.
Release the carburetor heater wire from the clamp.
Remove the carburetor heater and collar from the carburetor body by turn it counterclockwise, being careful not to damage the heater wire.

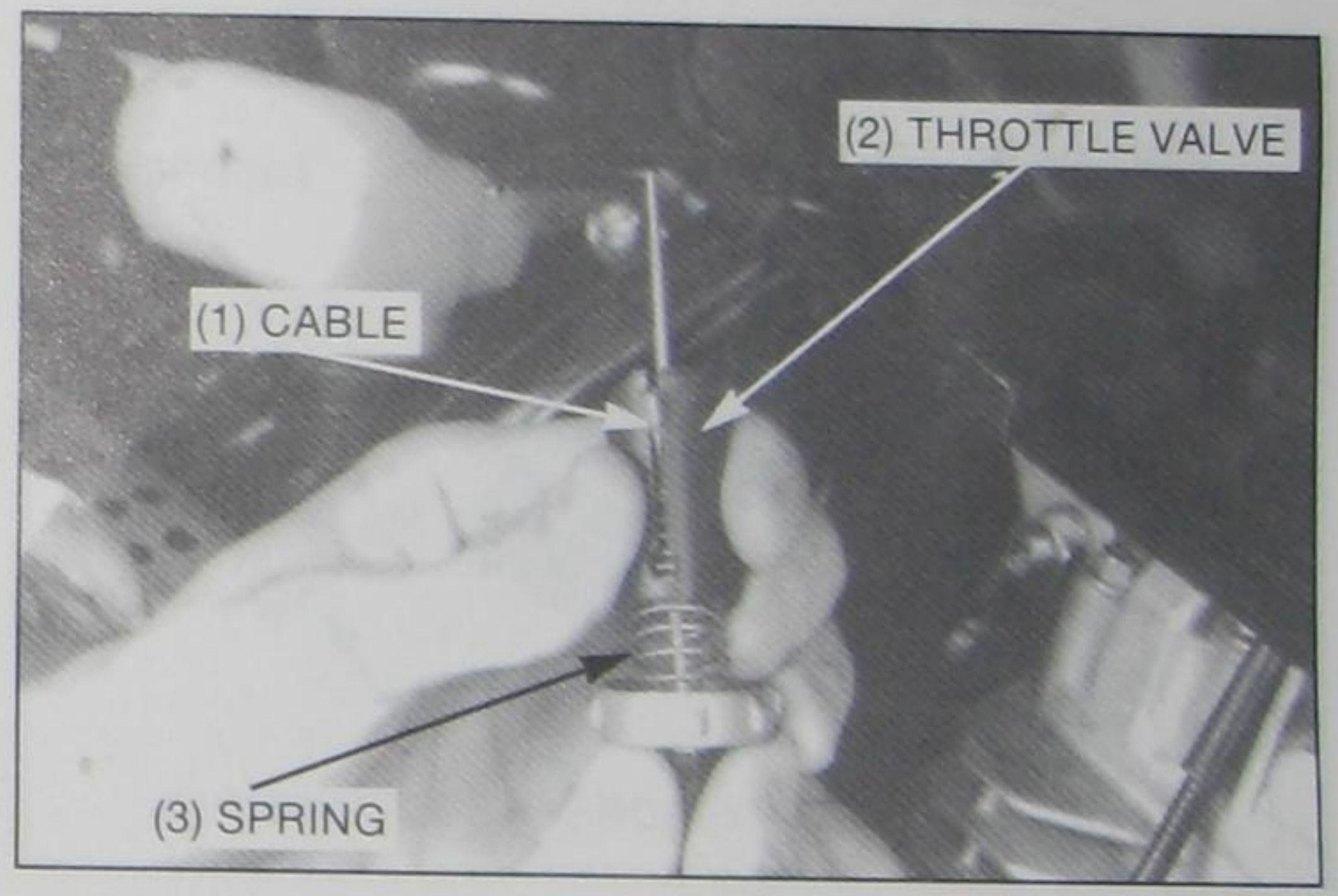
Loosen the connecting tube band screw.
Remove the mounting nuts.
Remove the carburetor assembly.



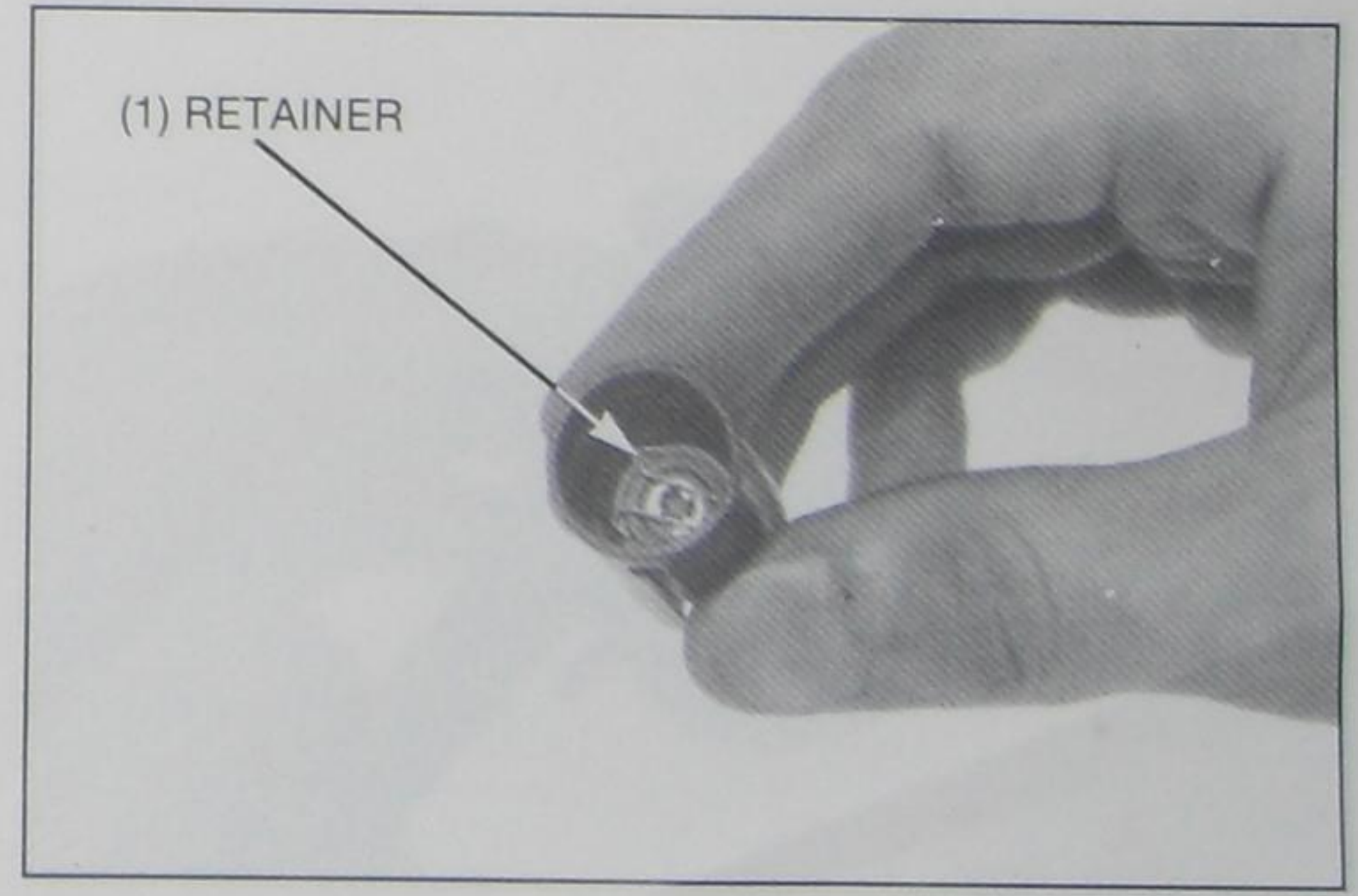
## Carburetor Disassembly/Inspection

### THROTTLE VALVE

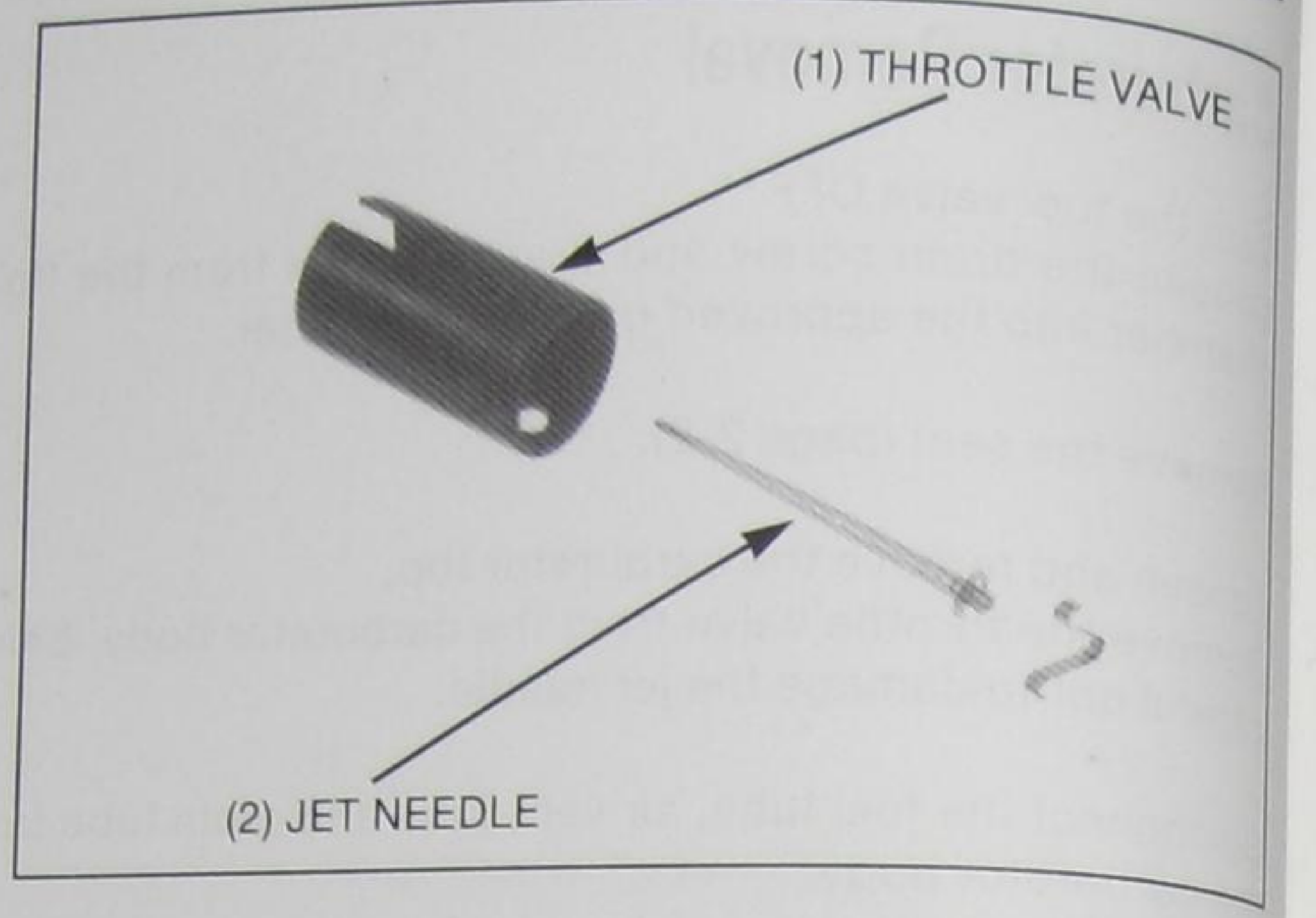
Disconnect the throttle cable from the throttle valve by compressing the throttle valve spring and remove the throttle valve and valve spring.



Remove the jet needle retainer and jet needle.

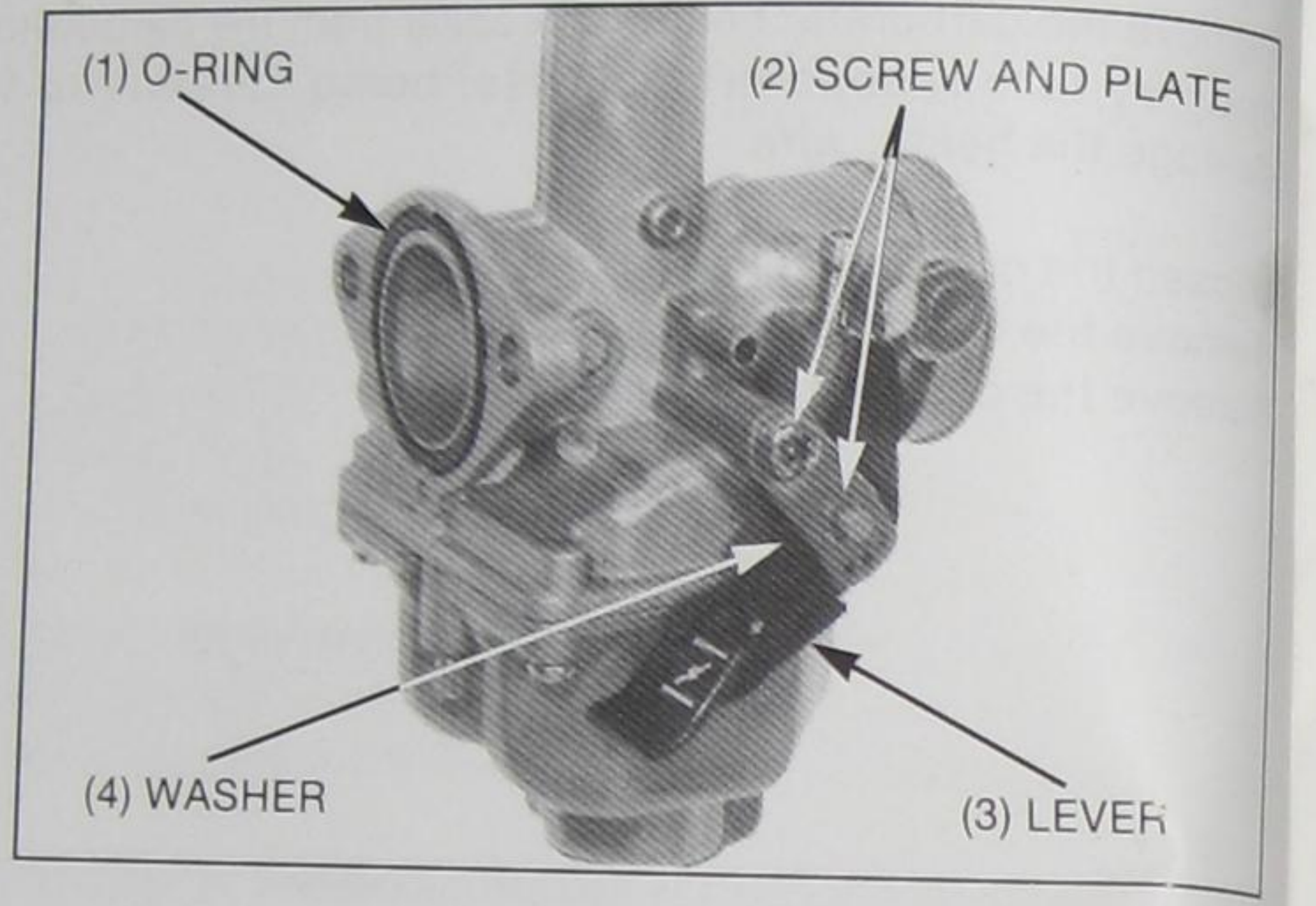


Check the throttle valve for scoring, scratches or damage.
Check the jet needle for stepped wear or damage.

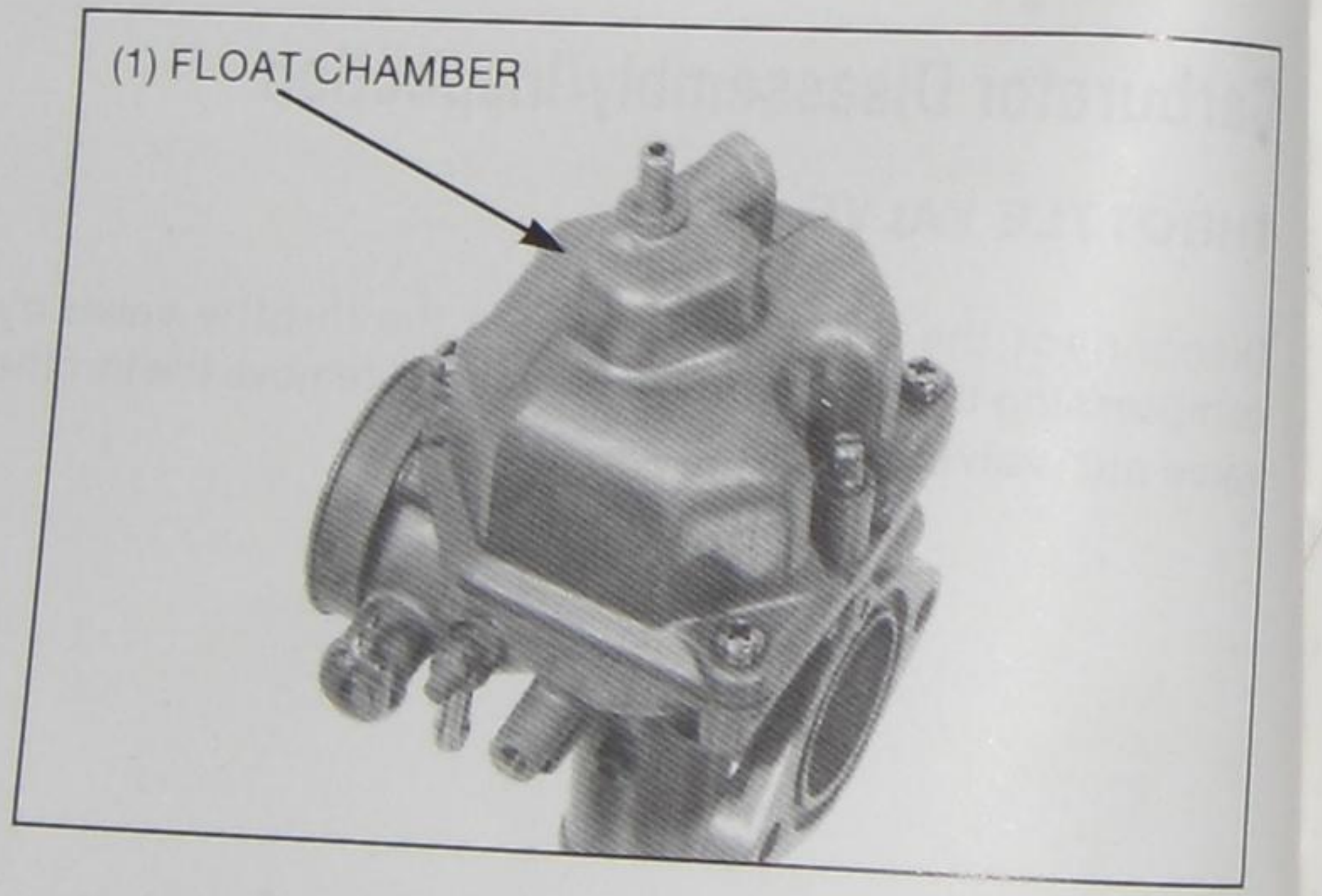

(1) THROTTLE VALVE
(2) JET NEEDLE

## CARBURETOR BODY

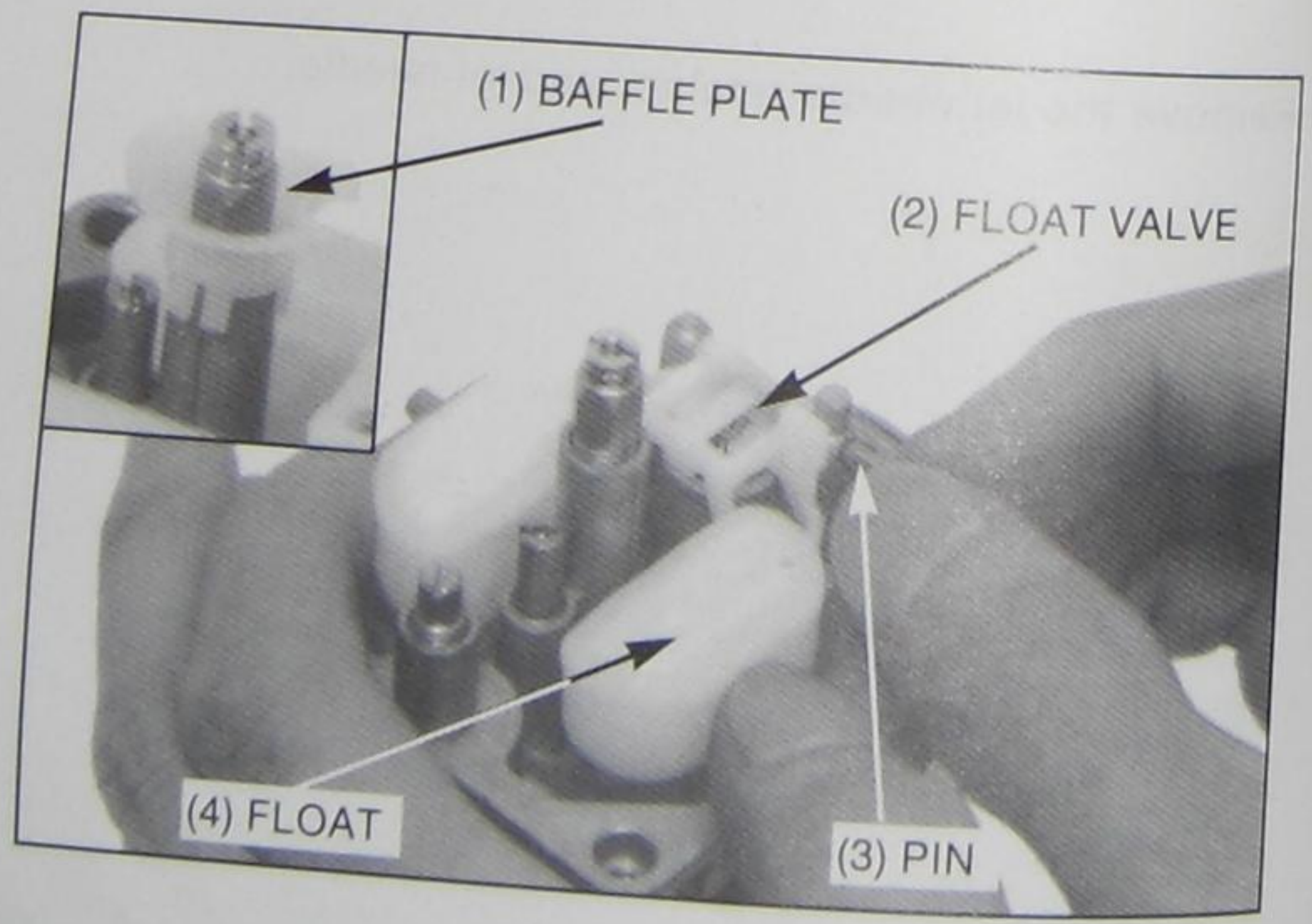
Remove the following:
- O-ring
- Choke lever screw
- Setting plate
- Choke lever
- Washer


(1) O-RING
(2) SCREW AND PLATE
(4) WASHER
(3) LEVER

- Three screws and float chamber

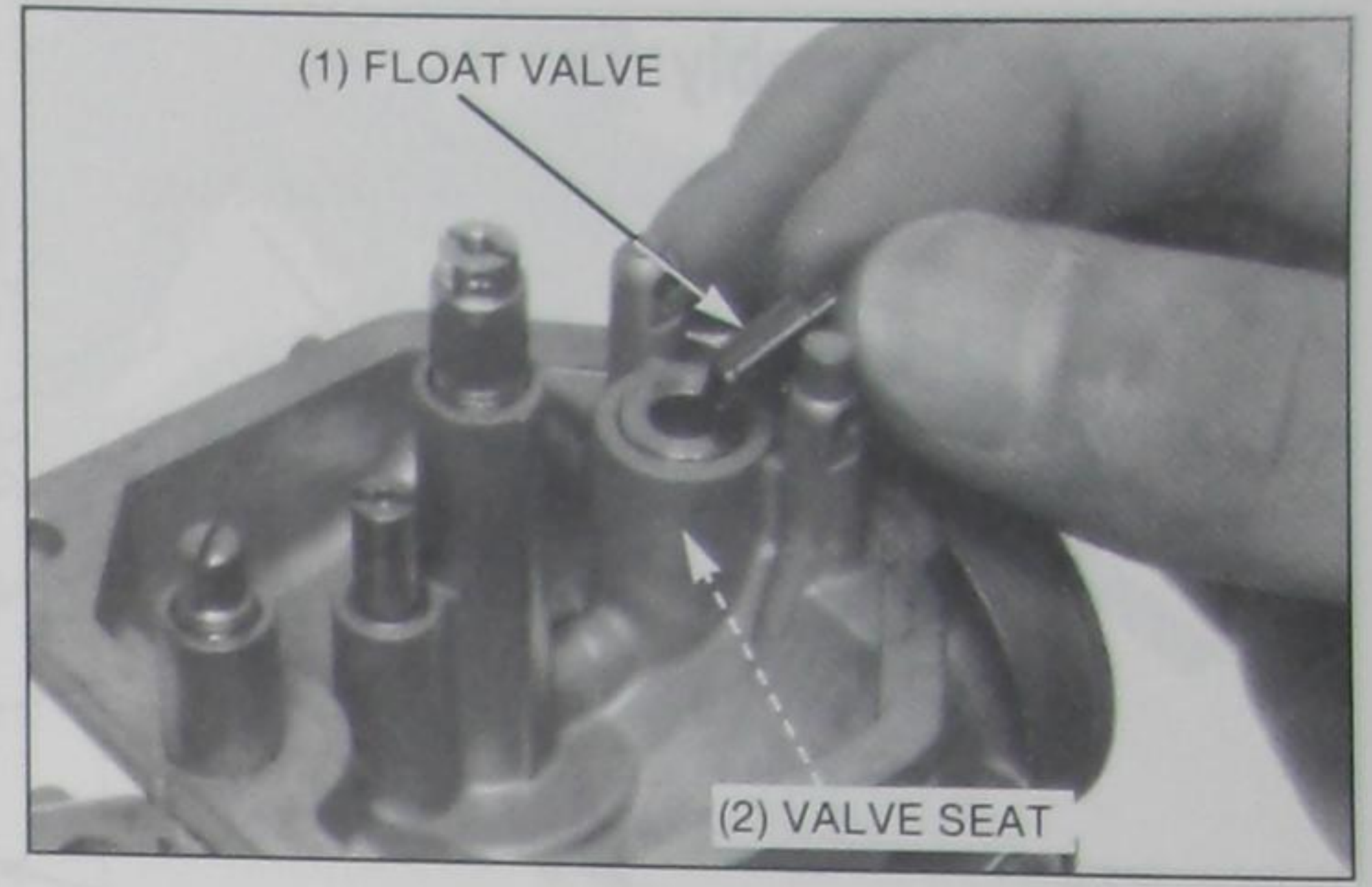

(1) FLOAT CHAMBER

- Baffle plate
- Float pin
- Float
- Float valve


(1) BAFFLE PLATE
(2) FLOAT VALVE
(4) FLOAT
(3) PIN

---

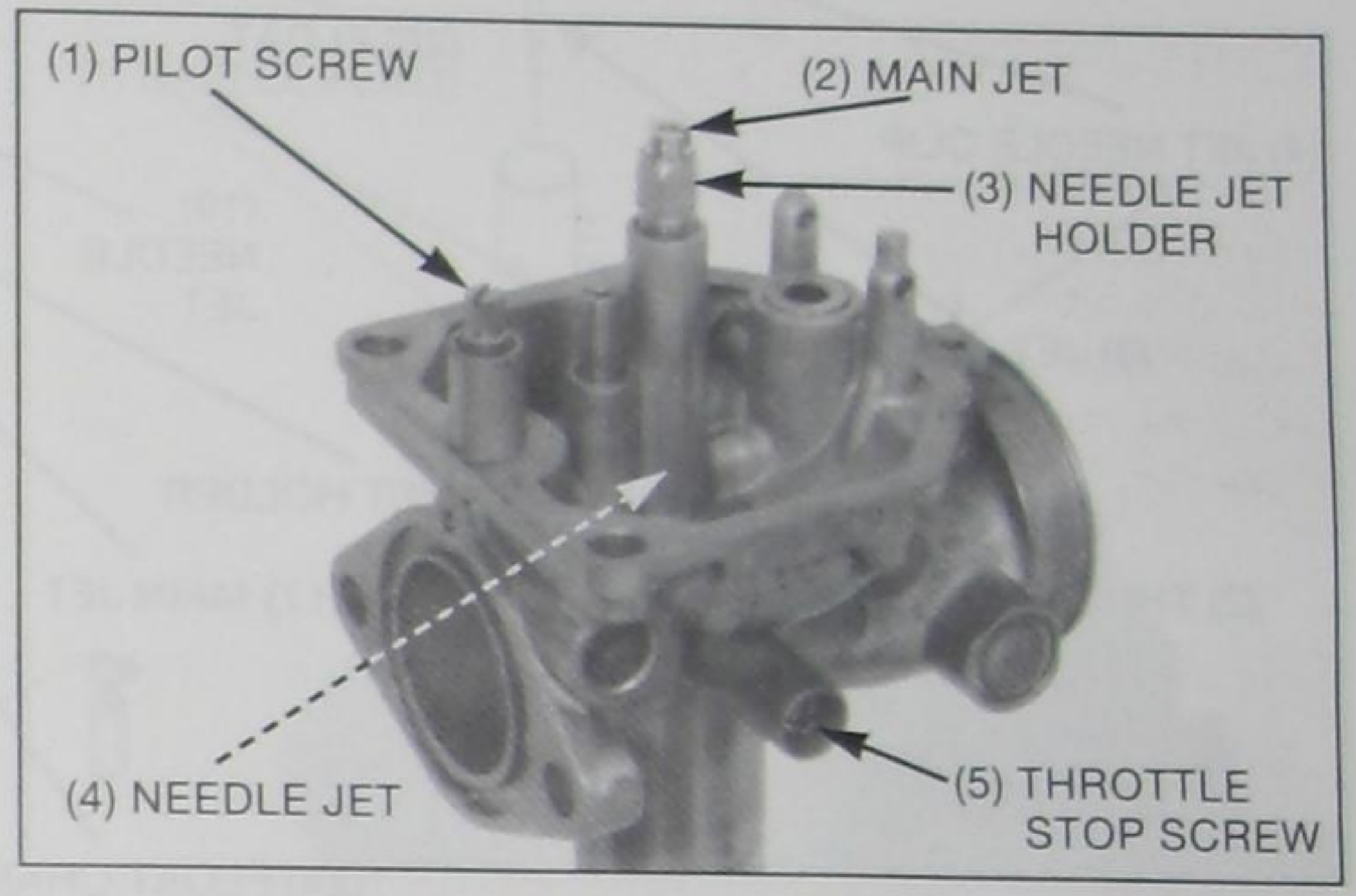
Check the float valve and valve seat for scoring, scratches, clogging or damage.
Check the tip of the float valve, where it contacts the valve seat, for stepped wear of contamination.
Check the operation of the float valve.


(1) FLOAT VALVE
(2) VALVE SEAT

Remove the following:
- Main jet
- Needle jet holder
- Needle jet
- Slow jet
- Throttle stop screw and spring

**CAUTION**

- **Handle the jets with care. They can easily be scored or scratched.**


(1) PILOT SCREW
(2) MAIN JET
(3) NEEDLE JET HOLDER
(4) NEEDLE JET
(5) THROTTLE STOP SCREW

Turn the pilot screw in and carefully count the number of turns until it seats lightly. Make a note of this to use as a reference when reinstalling the pilot screw.

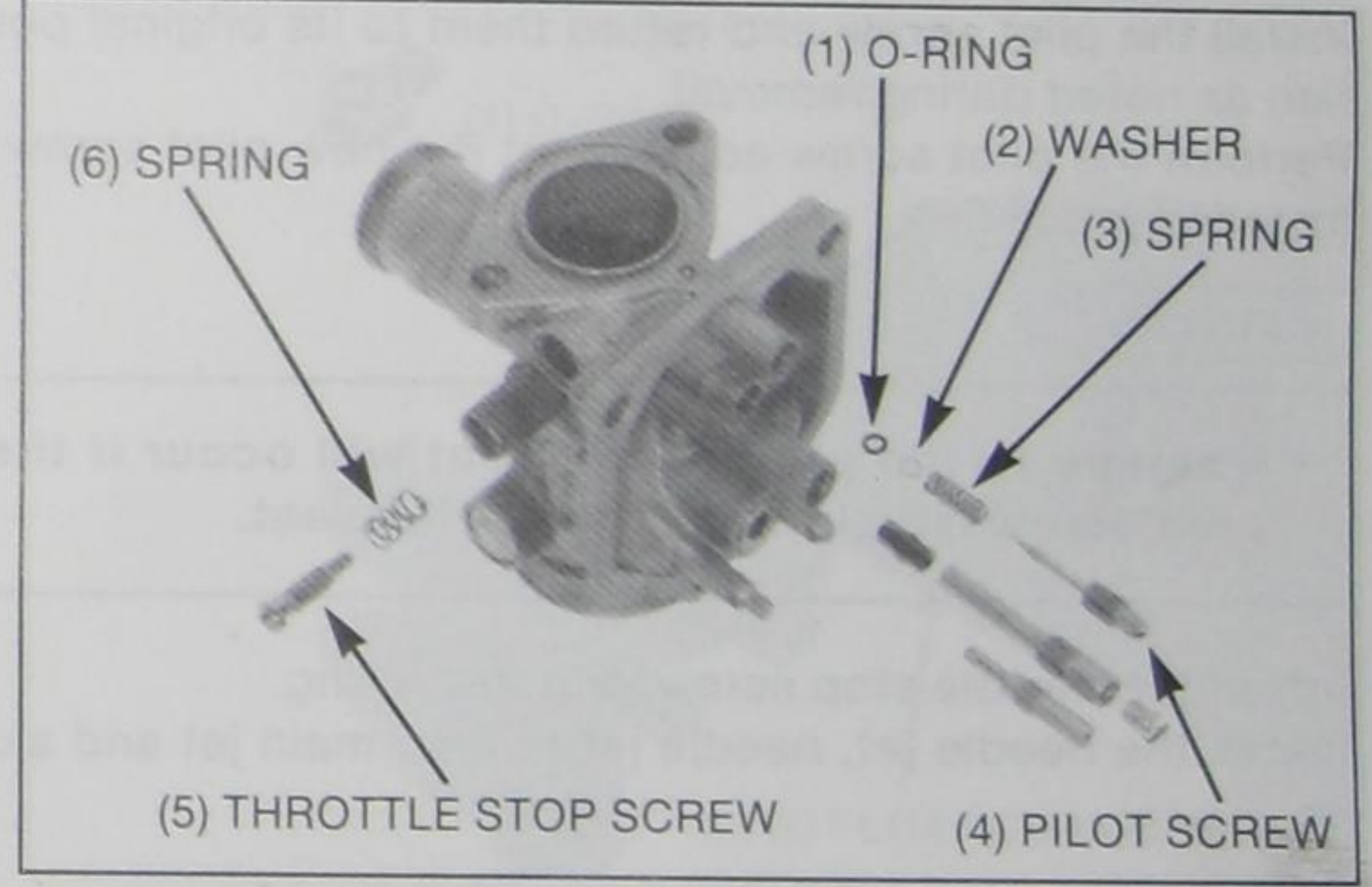
**CAUTION**

- **Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.**

Remove the pilot screw, spring, washer and O-ring.

Check each jet for wear or damage.
Check the pilot screw for wear or damage.

Clean the jets with cleaning solvent and blow open with compressed air.


(1) O-RING
(6) SPRING
(2) WASHER
(3) SPRING
(5) THROTTLE STOP SCREW
(4) PILOT SCREW

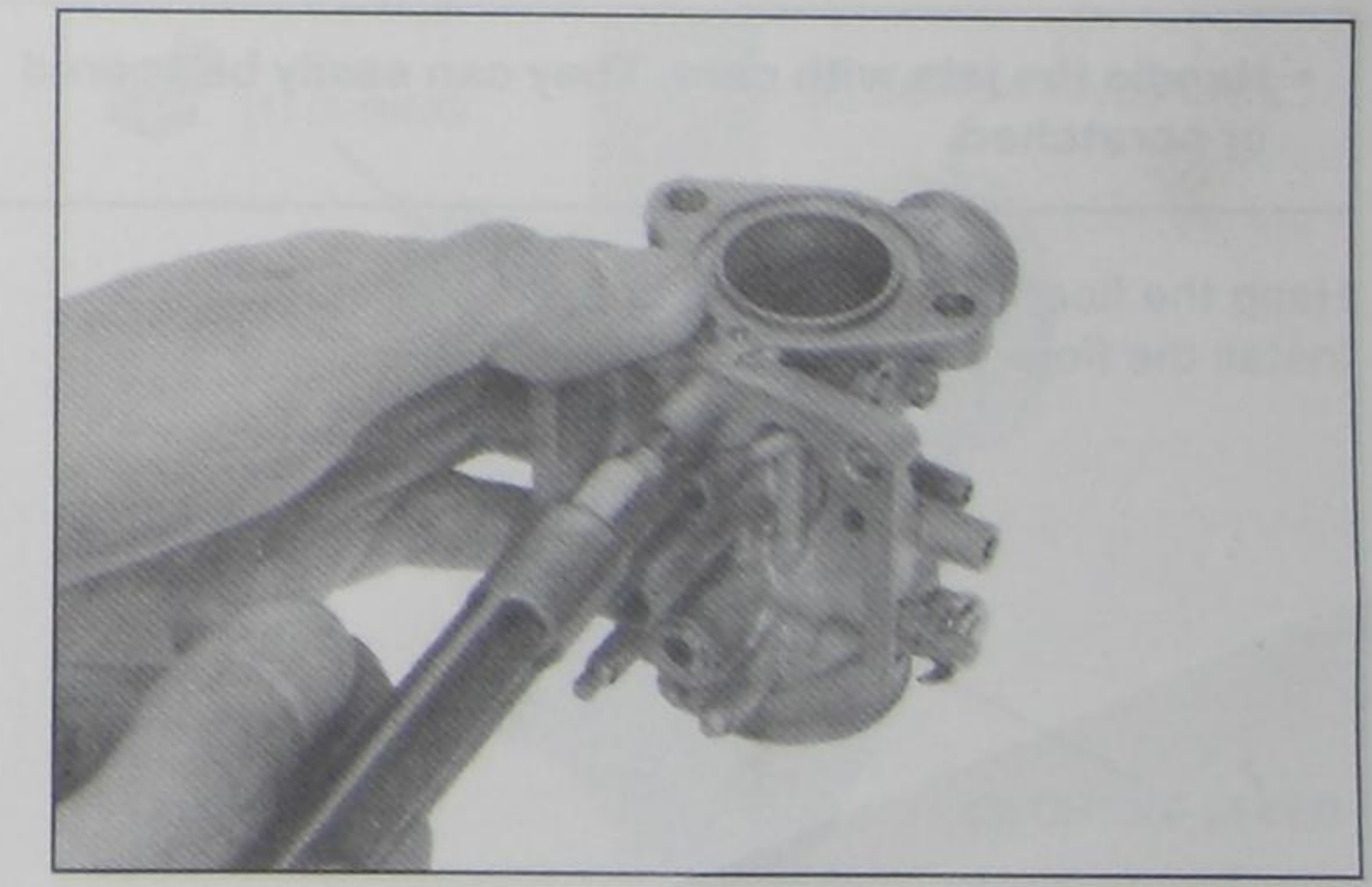
## CARBURETOR CLEANING

Remove all parts from the carburetor as mentioned above.

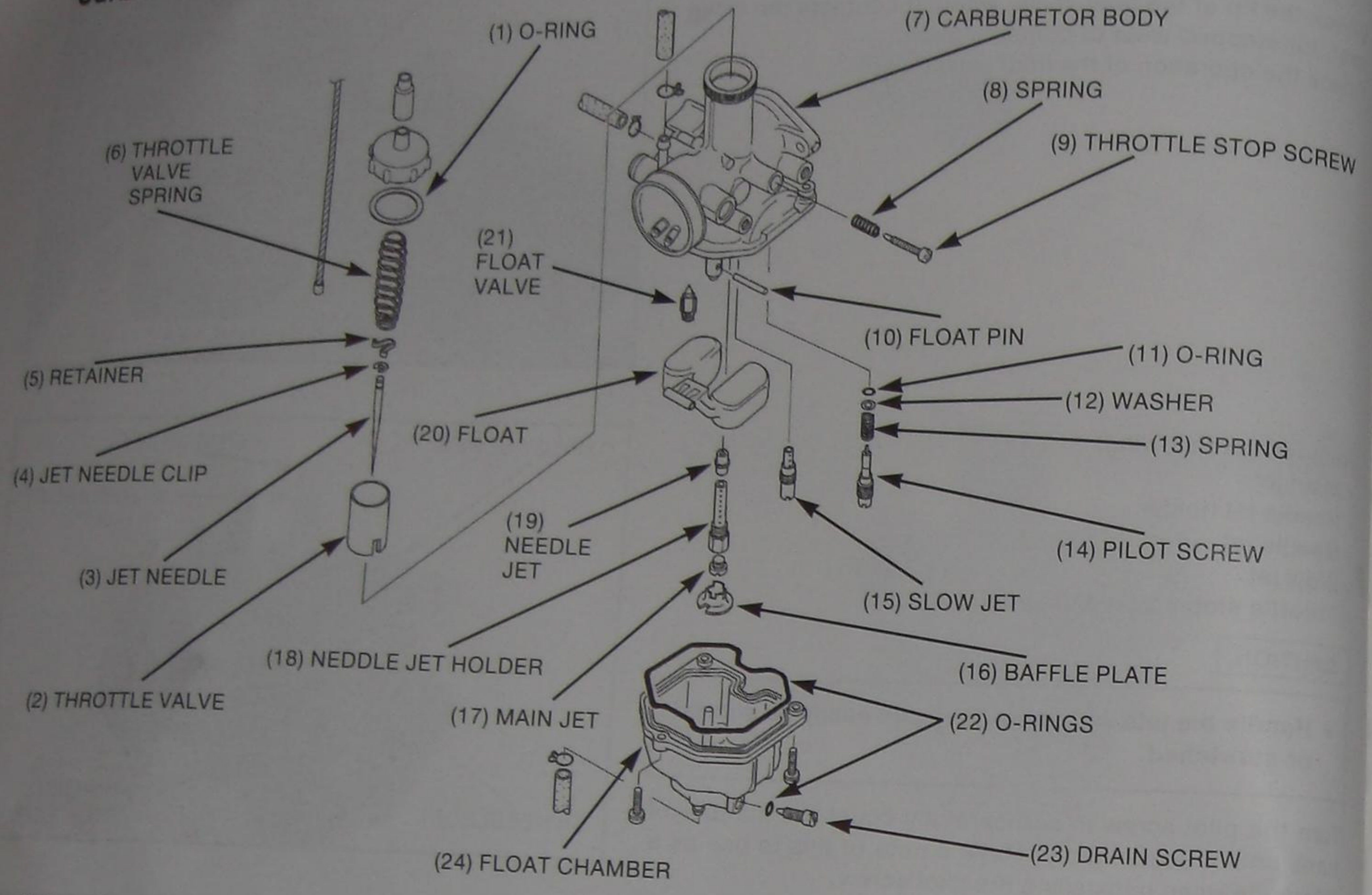
**CAUTION**

- **Cleaning the air and fuel passages with a piece of wire will damage the carburetor body.**

Blow open all air and fuel passages in the carburetor body with compressed air.



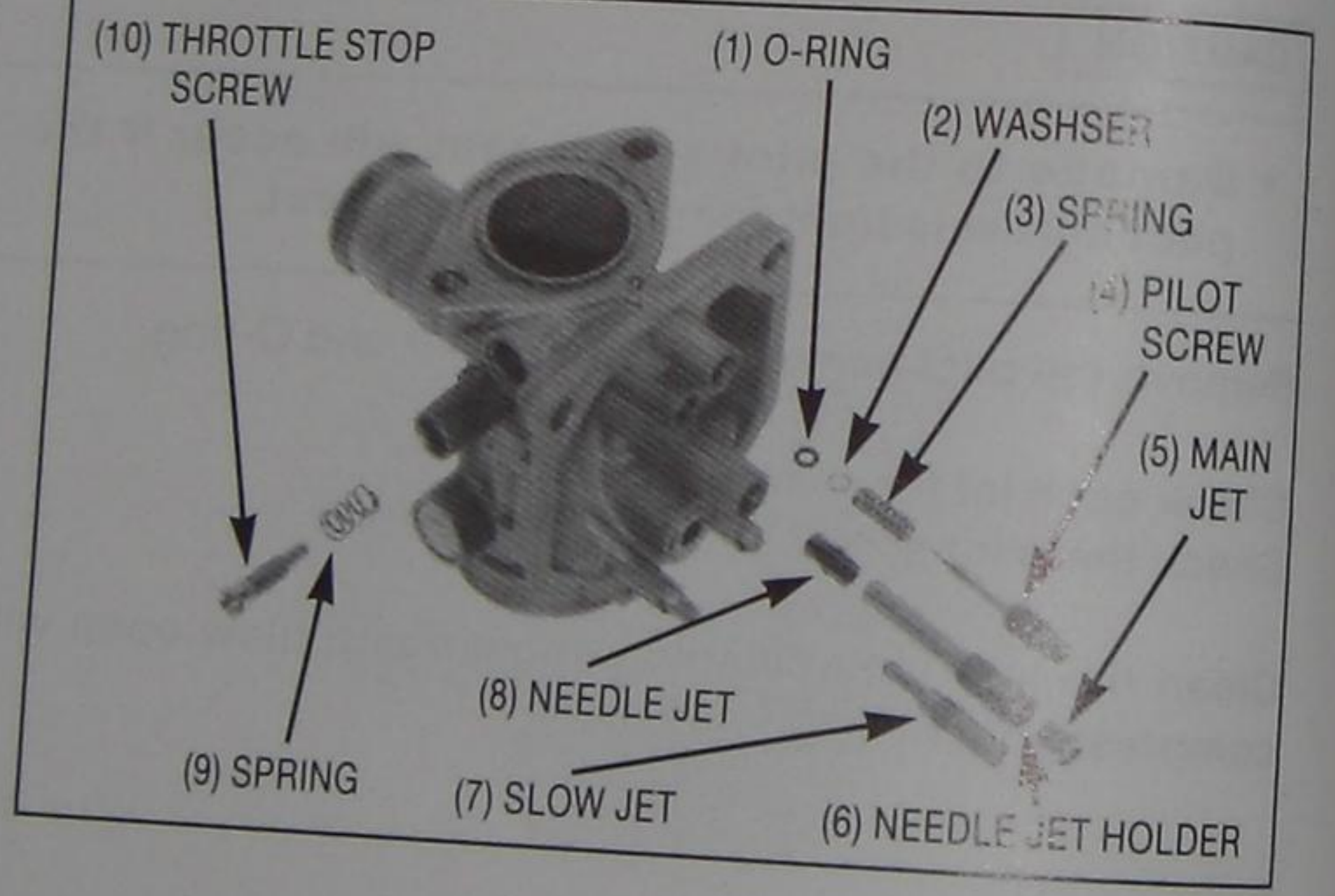
### Carburetor Assembly


(1) O-RING
(7) CARBURETOR BODY
(8) SPRING
(9) THROTTLE STOP SCREW
(6) THROTTLE VALVE SPRING
(21) FLOAT VALVE
(10) FLOAT PIN
(11) O-RING
(5) RETAINER
(12) WASHER
(20) FLOAT
(13) SPRING
(4) JET NEEDLE CLIP
(19) NEEDLE JET
(14) PILOT SCREW
(3) JET NEEDLE
(15) SLOW JET
(18) NEDDLE JET HOLDER
(16) BAFFLE PLATE
(2) THROTTLE VALVE
(17) MAIN JET
(22) O-RINGS
(24) FLOAT CHAMBER
(23) DRAIN SCREW

Install the pilot screw and return them to its original position as noted during removal.
Perform the pilot screw adjustment if a new pilot screw is installed (page 5-9).

**CAUTION**

- **Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.**

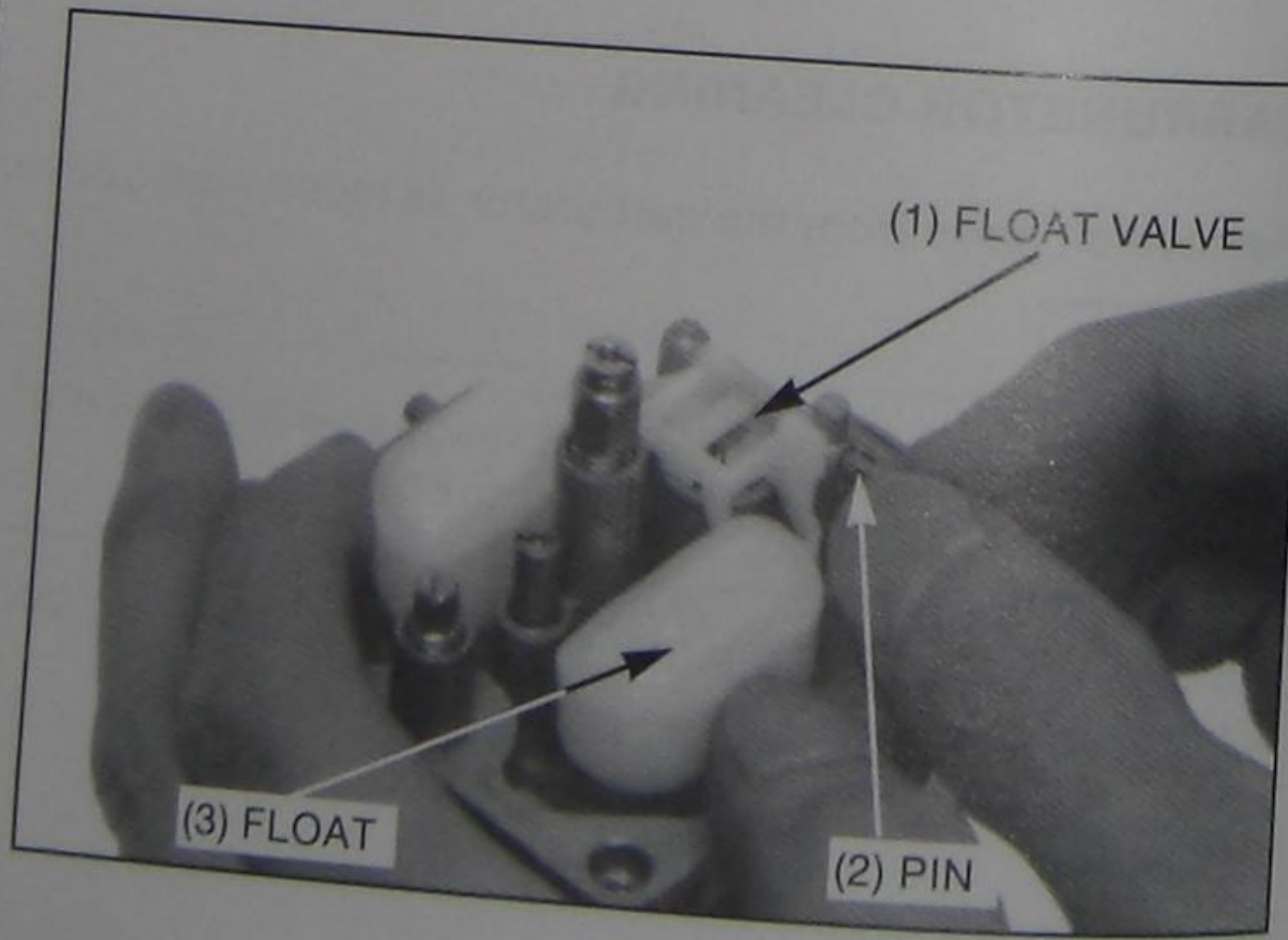

(10) THROTTLE STOP SCREW
(1) O-RING
(2) WASHSER
(3) SPRING
(4) PILOT SCREW
(5) MAIN JET
(8) NEEDLE JET
(9) SPRING
(7) SLOW JET
(6) NEEDLE JET HOLDER

Install the throttle stop screw with the spring.
Install the needle jet, needle jet holder, main jet and slow jet.

**CAUTION**

- **Handle the jets with care. They can easily be scored or scratched.**

Hang the float valve onto the float arm lip.
Install the float valve, float and float pin.


(1) FLOAT VALVE
(3) FLOAT
(2) PIN

---

## FLOAT LEVEL INSPECTION

With the float valve seated and the float arm just touching the valve, measure the float level gauge.

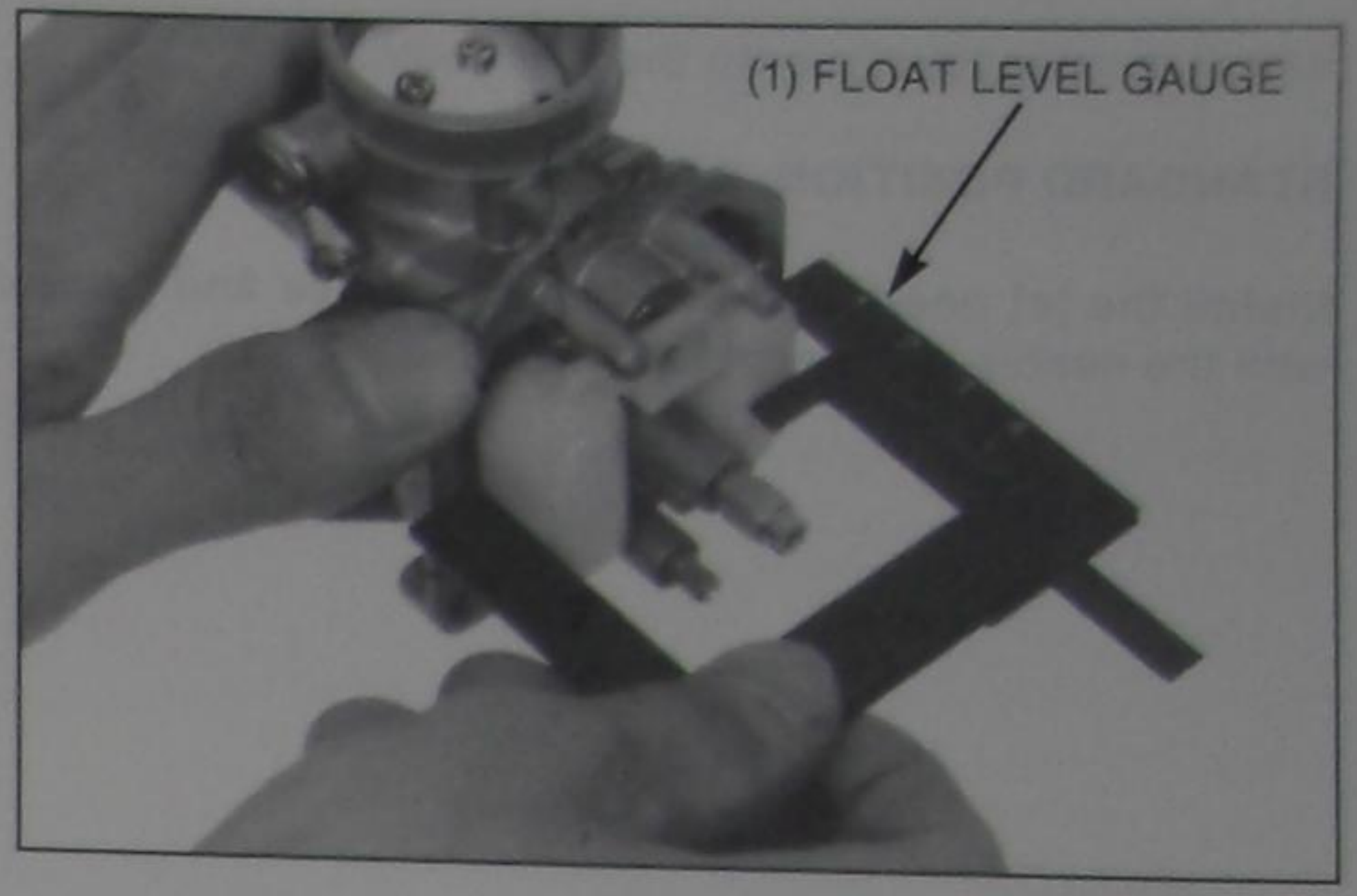
NOTE:

- Set the float level gauge so that is perpendicular to the float chamber face and inline with the main jet.

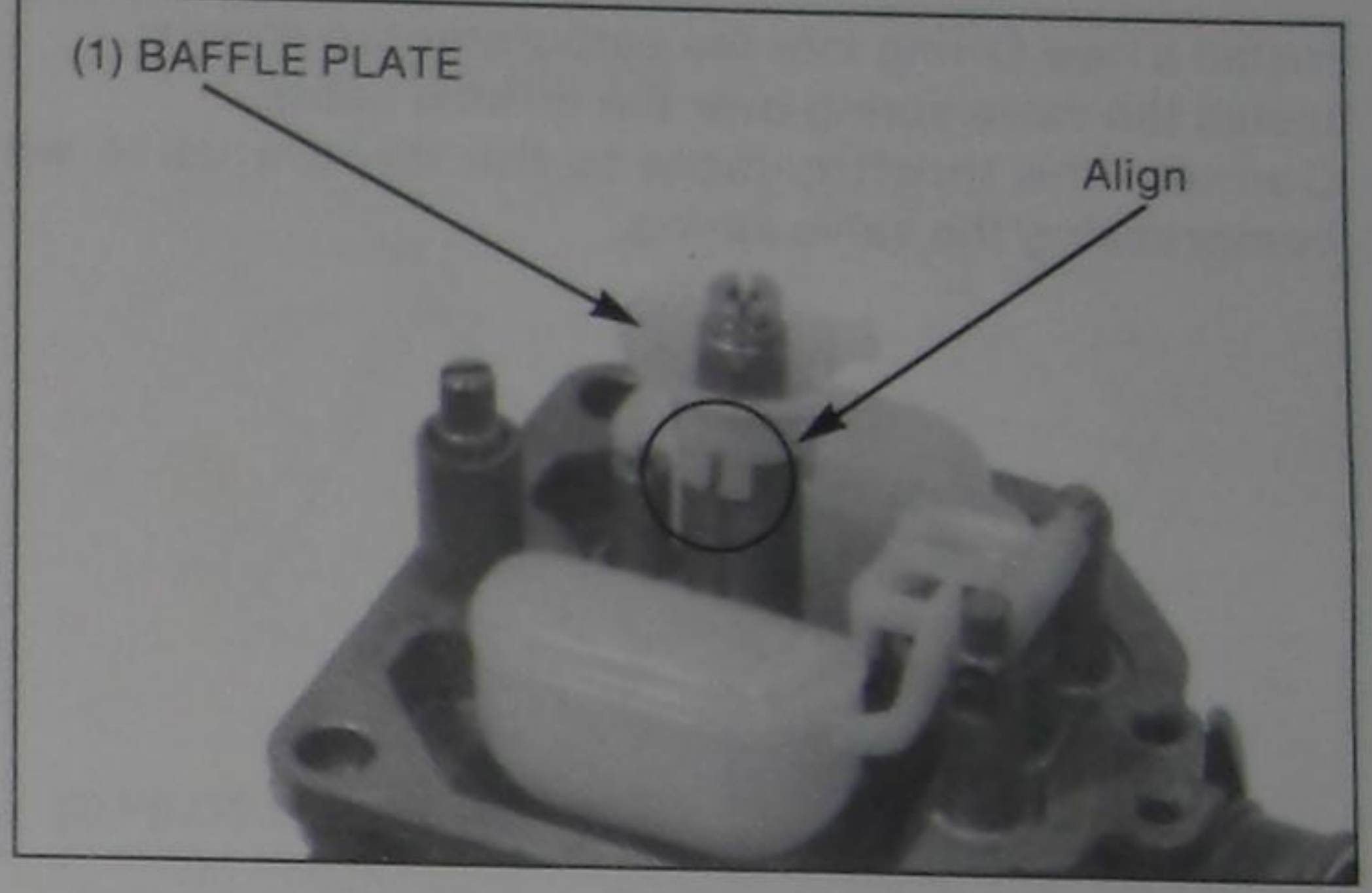
**TOOL:**
**Float level gauge** 07401-0010000

**FLOAT LEVEL: 14 mm (0.55 in)**

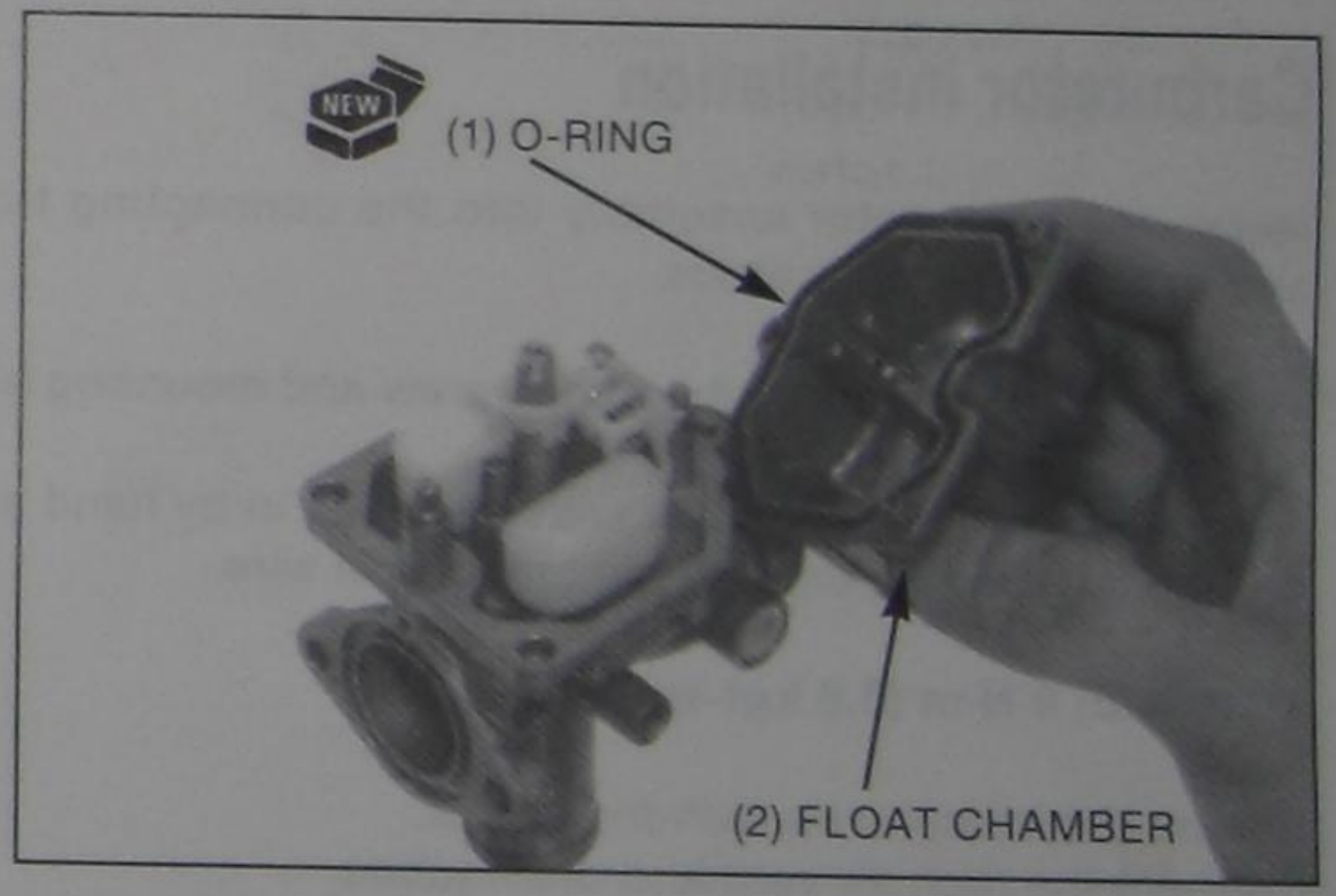
The float level cannot be adjusted.
Replace the float assembly if the float level is out of specification.


(1) FLOAT LEVEL GAUGE

Install the baffle plate, aligning the its groove with the lug on the carburetor body.

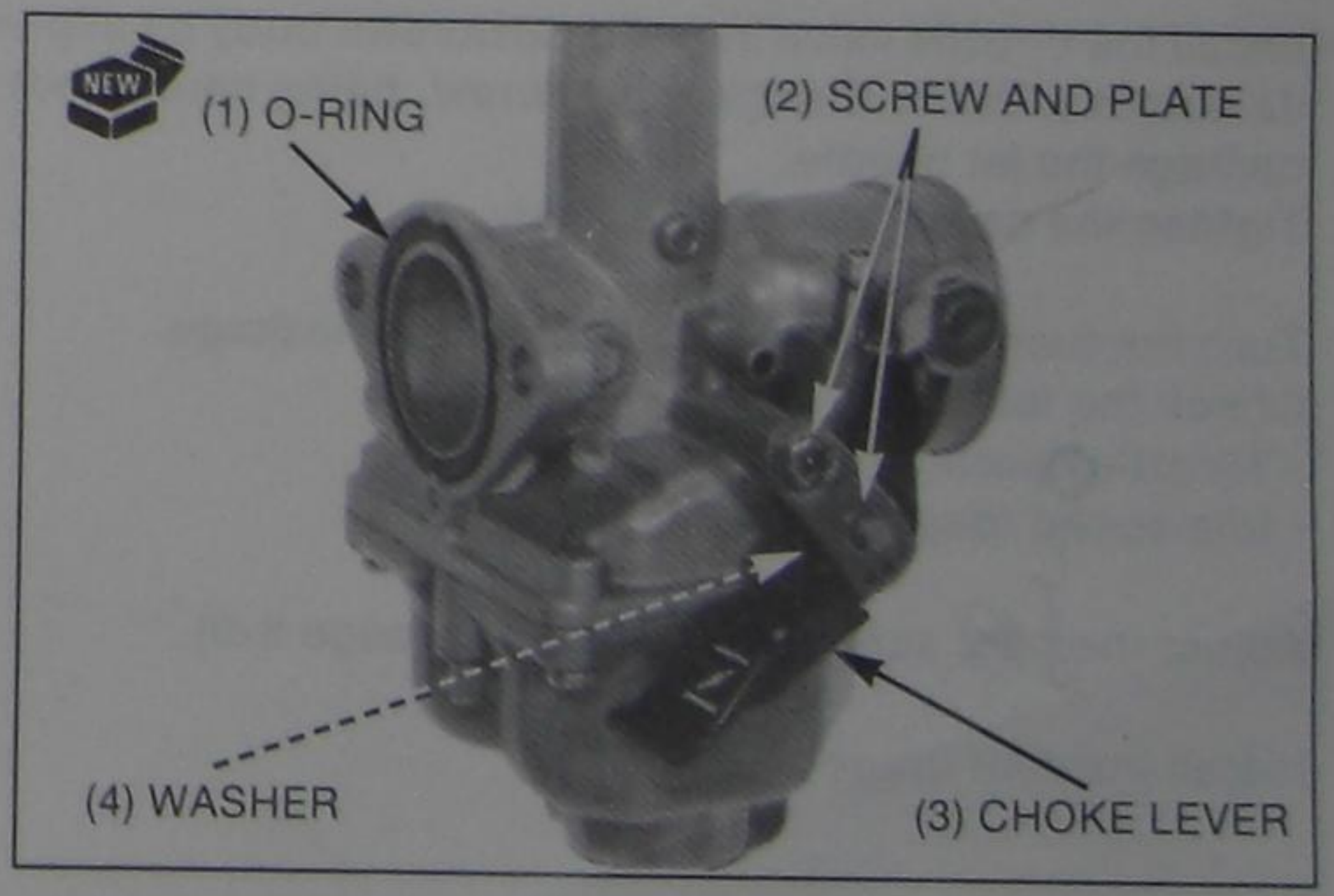

(1) BAFFLE PLATE
Align

Install a new O-ring into the float chamber groove.
Install the float chamber and tighten the three screws.


NEW
(1) O-RING
(2) FLOAT CHAMBER

Install the washer (between the carburetor body and lever) and choke lever onto the pivot boss and secure it with the setting plate and screw as shown.

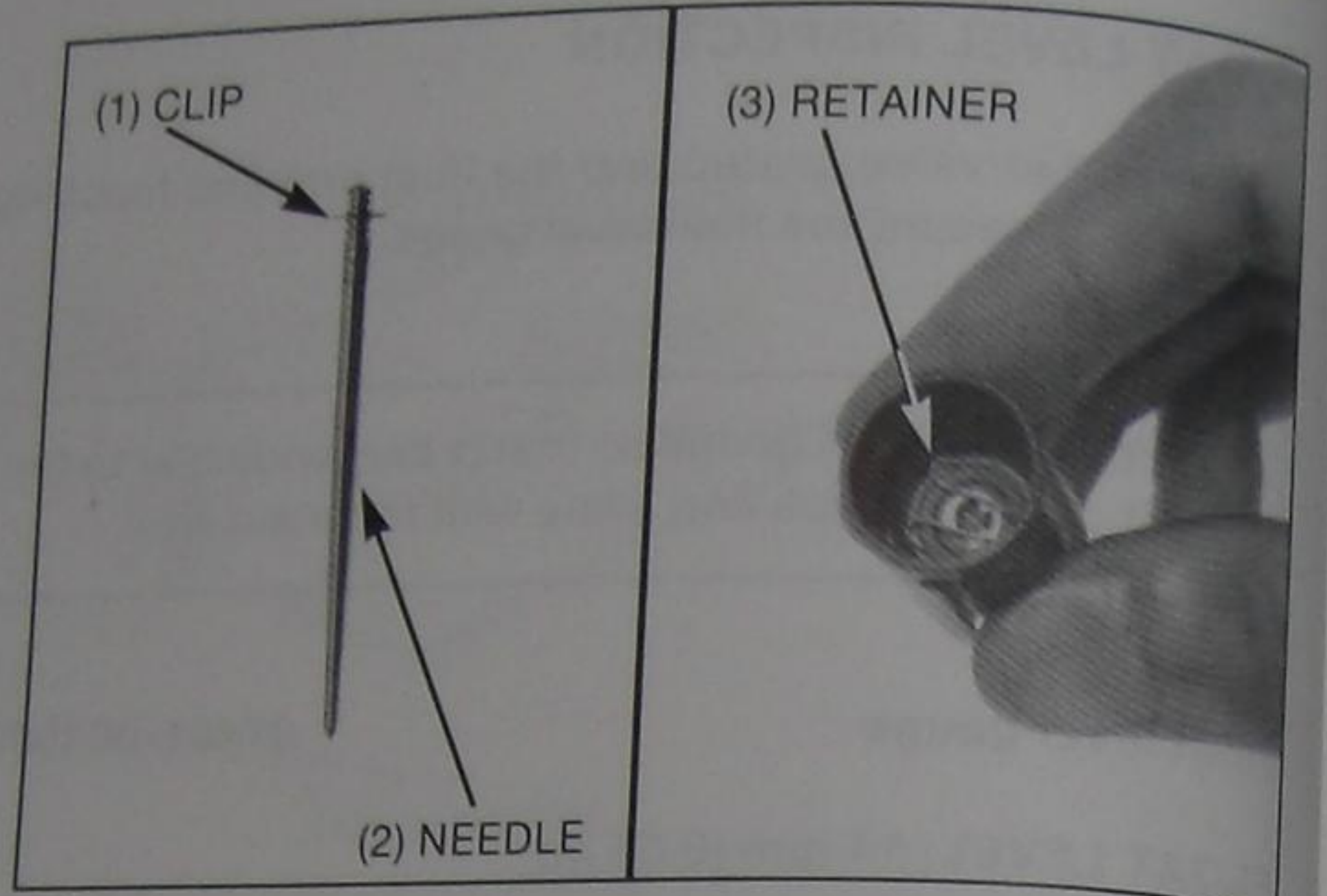
Coat a new O-ring with oil and install it into the carburetor groove.


NEW
(1) O-RING
(2) SCREW AND PLATE
(4) WASHER
(3) CHOKE LEVER

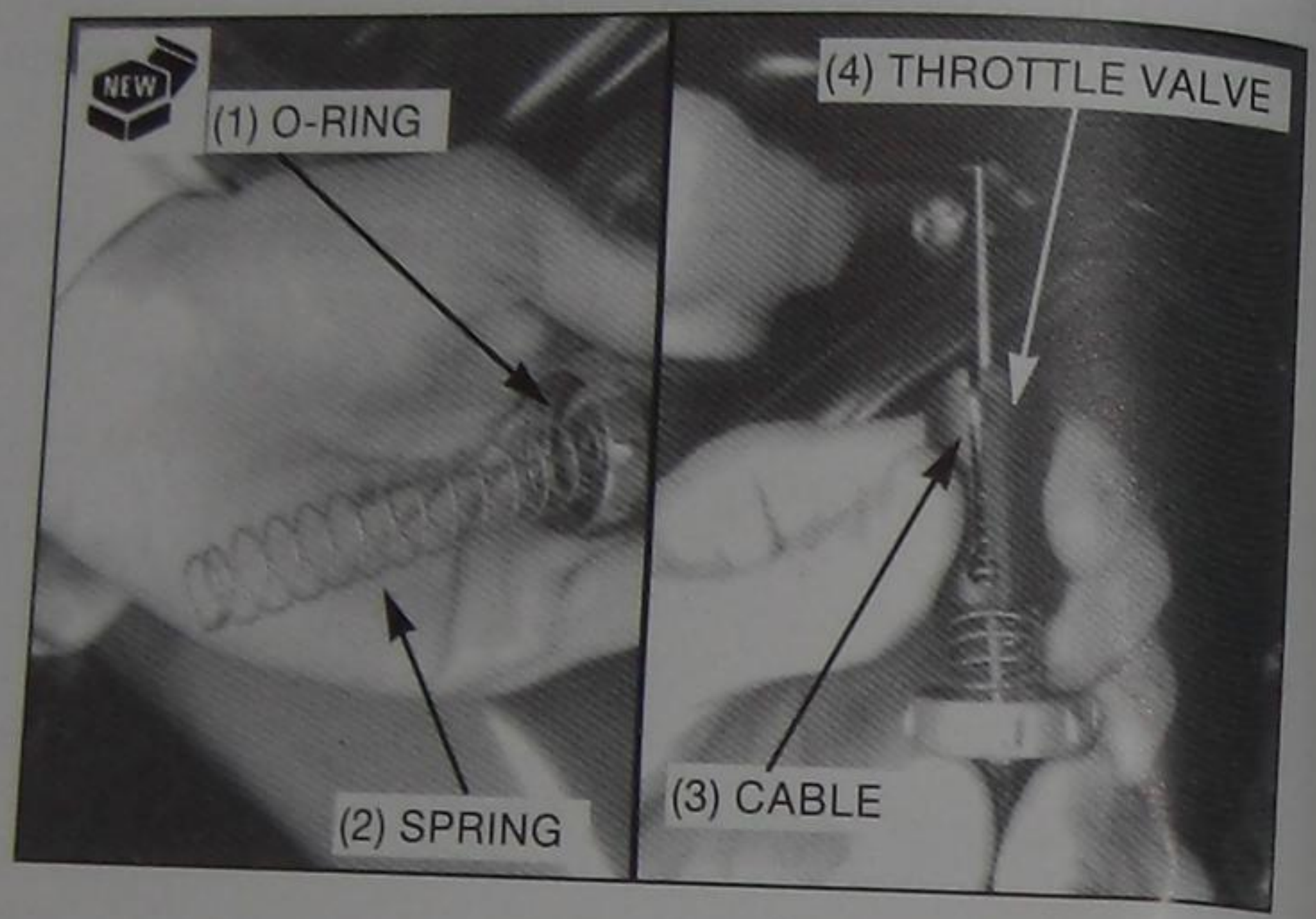
Install the needle clip onto the jet needle.

**STANDARD POSITION: 3rd groove from top**

Install the jet needle into the throttle valve and secure it with the needle retainer securely.



Install a new O-ring into the carburetor top groove.
Install the valve spring over the throttle cable.
Connect the throttle cable to the throttle valve while compressing the valve spring.



## Carburetor Installation

Install the carburetor assembly into the connecting tube and onto the insulator studs.

Tighten the connecting tube band screw and mounting nut.

Thread the carburetor heater with the collar in by hand and tighten it, being careful not to damage the wire.

**TORQUE: 8 N·m (0.8 kgf-m, 5.8 lbf-ft)**

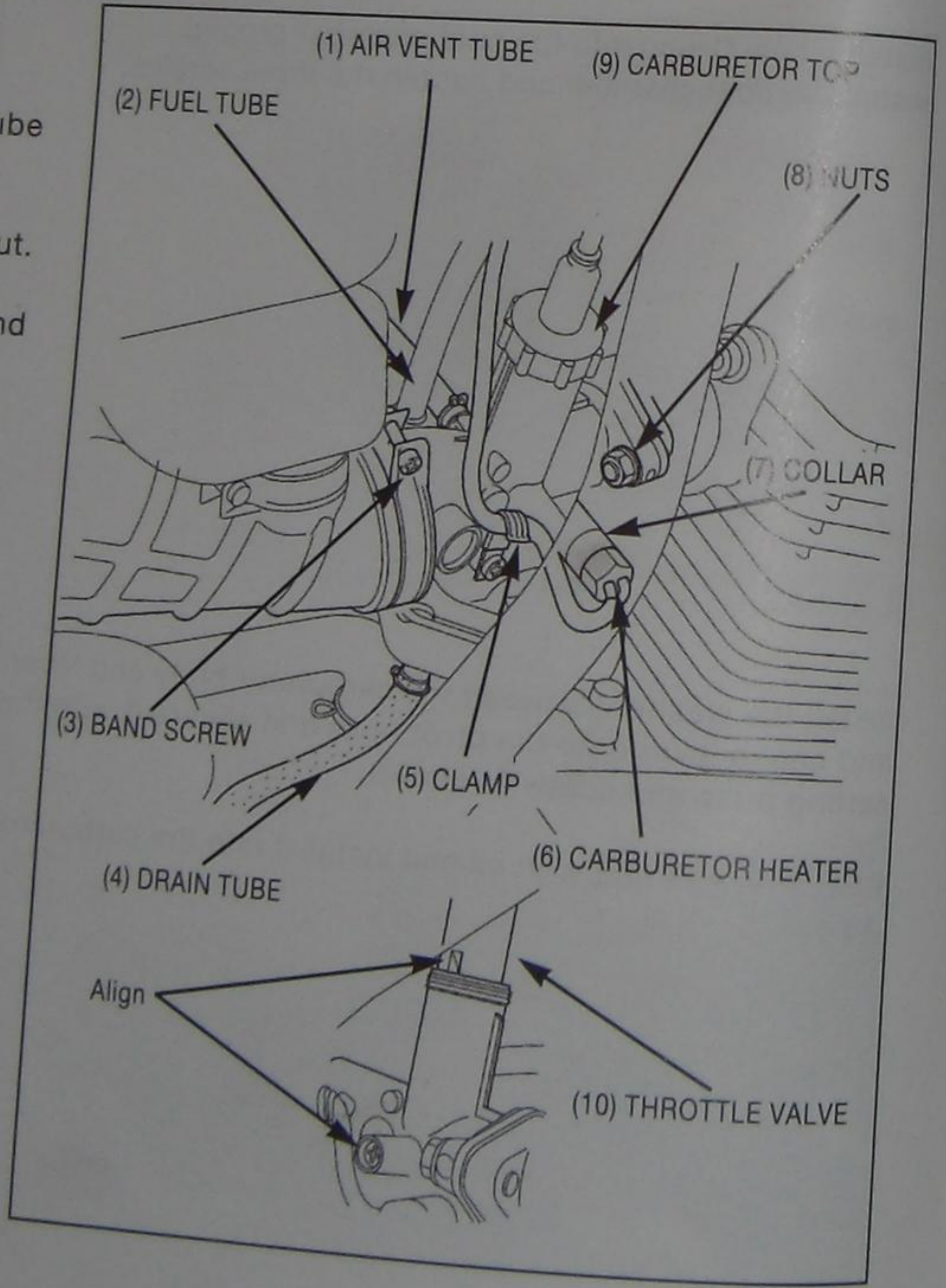
Secure the heater wire with the clamp.
Connect the fuel, air vent and drain tubes.

Install the throttle valve into the carburetor body by aligning its cutout with the throttle stop screw, being careful not to damage the jet needle.
Tighten the carburetor top securely.

Turn the fuel valve ON and check for fuel leakage.
Check the following:
- Throttle operation (page 3-4)
- Idle speed (page 3-9)

Adjust the pilot screw if it is replaced (page 5-9).

Install the seat (page 2-2).



## Pilot Screw Adjustment

NOTE:

- The pilot screw is factory pre-set. Adjustment is not necessary unless the carburetor is overhauled or a new pilot screw is installed.

**CAUTION**

- **Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.**

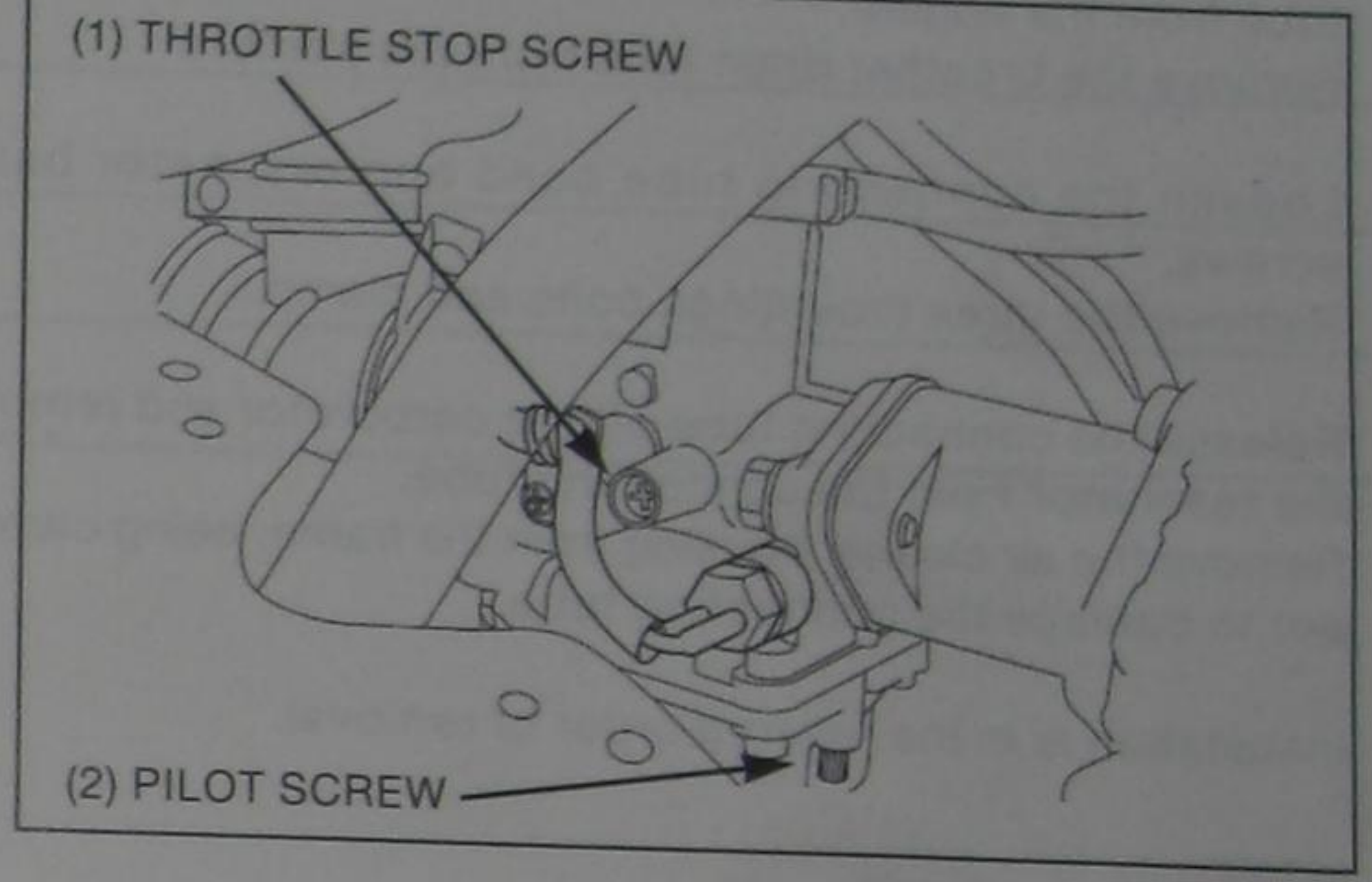
1. Turn the pilot screw clockwise until it seats lightly and then back it out to the specification.

**PILOT SCREW INITIAL OPENING: 1 — 1/2 turns out**

2. Warm up the engine to the normal operating temperature. Stop and go riding for 10 minutes is sufficient.
3. Stop the engine and attach the tachometer according to the tachometer manufacturer's instructions.
4. Start the engine and adjust the idle speed to specified rpm with the throttle stop screw.

**IDLE SPEED: 1,400 ± 100 min$^{-1}$ (rpm)**

5. Turn the pilot screw in or out slowly to obtain the highest engine speed.
6. Readjust the idle speed to the specified value with the throttle stop screw.
7. Make sure that the engine does not miss or run erratically. Repeat steps 5 and 6 until engine speed increases smoothly.



## Air Cleaner Housing

### REMOVAL/INSTALLATION

Remove the following:
- Seat (page 2-2)
- Side cover (page 2-3).

Release the wires from the clamps on the air cleaner housing.
Remove the two screws and the fuse box.
Remove the air temperature switch from the stud on the air cleaner housing.

Remove the tube clip and disconnect the crankcase breather tube from the engine.
Remove the breather drain tube from the frame.

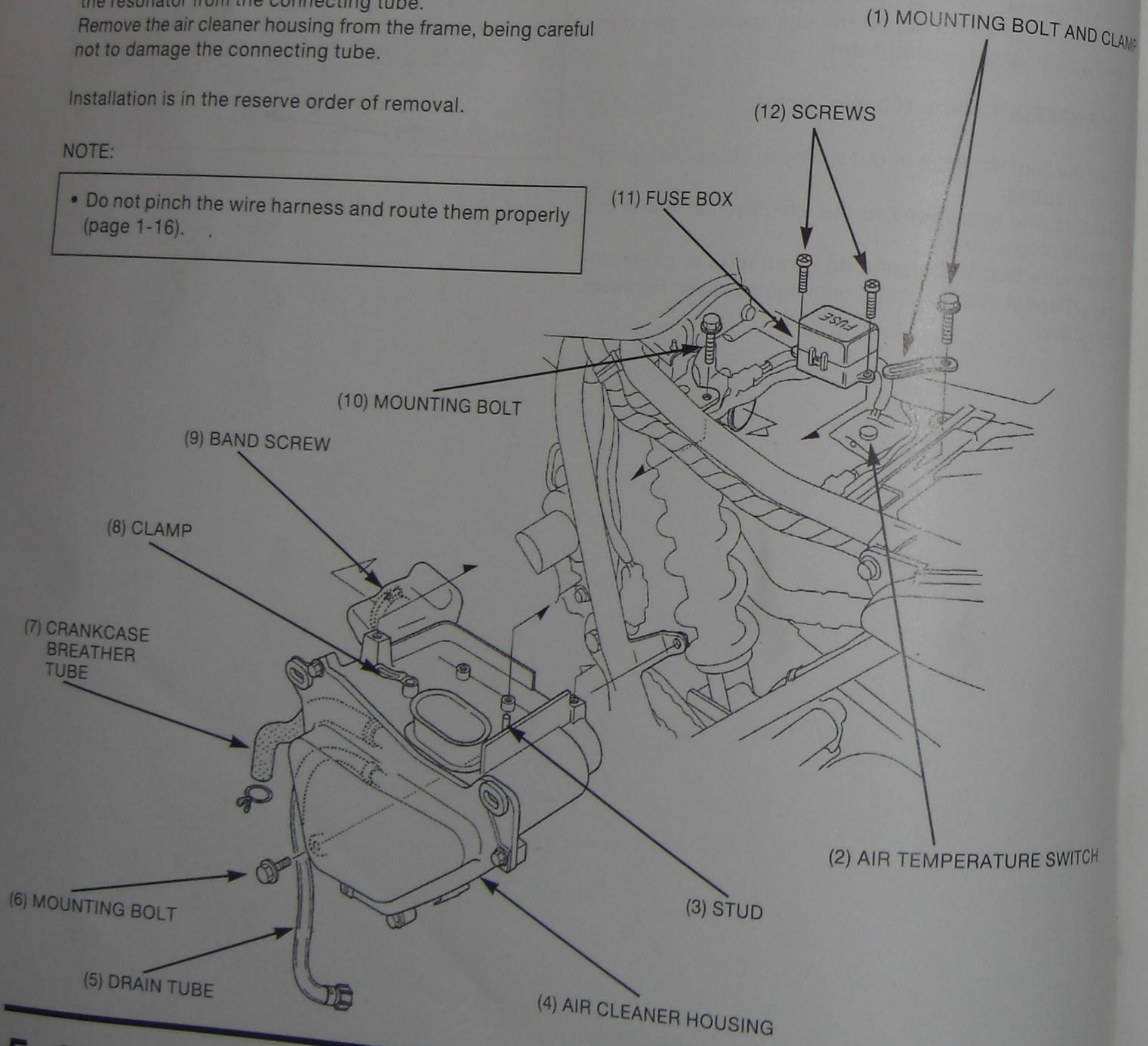
Loosen the connecting tube band and resonator band screws.
Remove the three mountings bolts and clamp.

Release the connecting tube off the carburetor and remove the resonator from the connecting tube.
Remove the air cleaner housing from the frame, being careful not to damage the connecting tube.

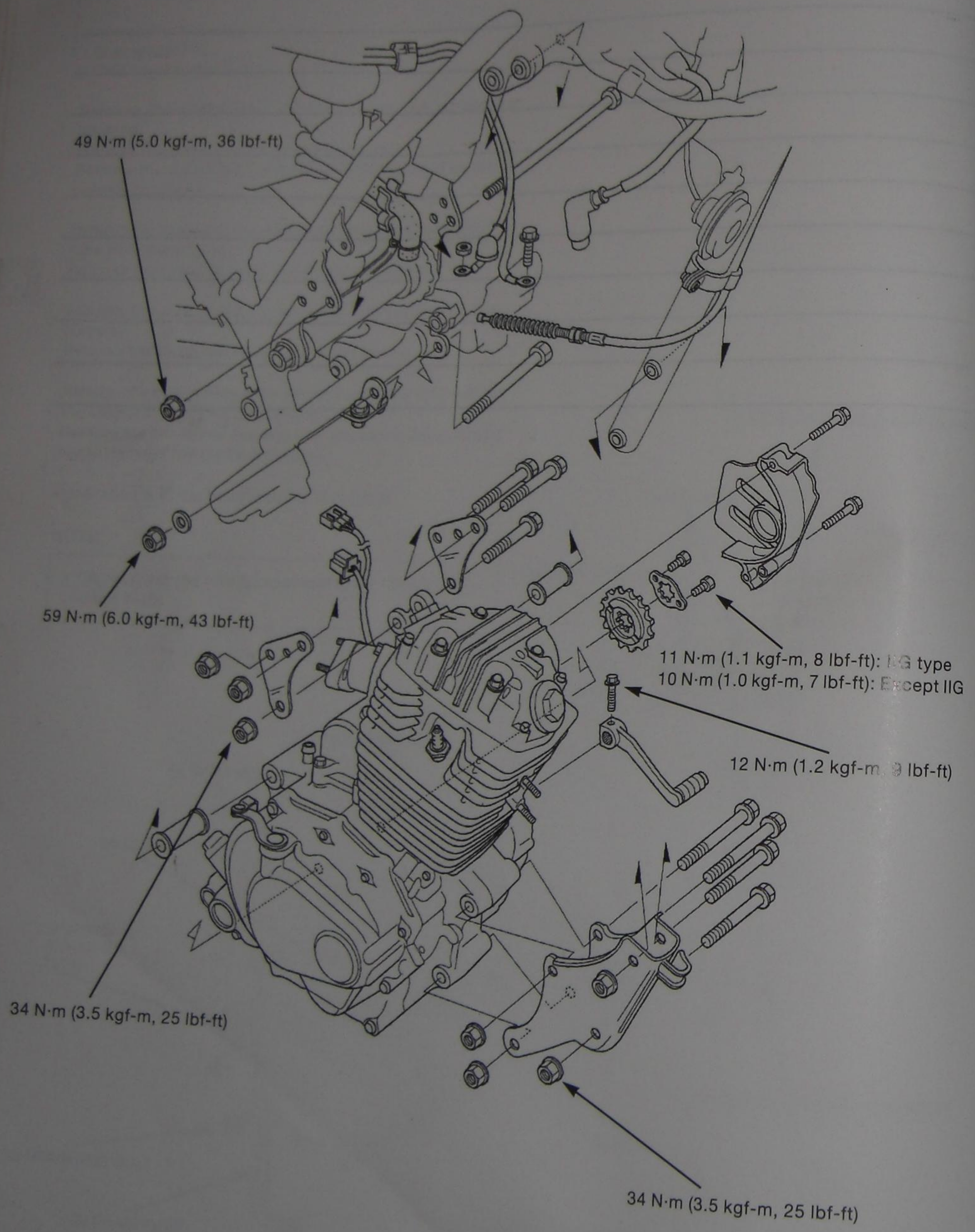
Installation is in the reserve order of removal.

NOTE:

- Do not pinch the wire harness and route them properly (page 1-16).


(1) MOUNTING BOLT AND CLAMP
(12) SCREWS
(11) FUSE BOX
FUSE
(10) MOUNTING BOLT
(9) BAND SCREW
(8) CLAMP
(7) CRANKCASE BREATHER TUBE
(2) AIR TEMPERATURE SWITCH
(6) MOUNTING BOLT
(3) STUD
(5) DRAIN TUBE
(4) AIR CLEANER HOUSING

## MEMO


49 N·m (5.0 kgf-m, 36 lbf-ft)
59 N·m (6.0 kgf-m, 43 lbf-ft)
11 N·m (1.1 kgf-m, 8 lbf-ft): IIG type
10 N·m (1.0 kgf-m, 7 lbf-ft): Except IIG
12 N·m (1.2 kgf-m, 9 lbf-ft)
34 N·m (3.5 kgf-m, 25 lbf-ft)
34 N·m (3.5 kgf-m, 25 lbf-ft)

# 6. Engine Removal/Installation

SERVICE INFORMATION 6-1
ENGINE REMOVAL 6-2
ENGINE INSTALLATION 6-4

## Service Information

### GENERAL

- Tape the frame around the engine beforehand for frame protection.
- A safety stand or equivalent is required to support the motorcycle when removing and installing the engine.
- A floor jack or other adjustable support is required to support and maneuver the engine.
- The following components require engine removal for service:
  - Cylinder head /valve (section 7)
  - Cylinder/piston (section 8)
  - Crankcase/transmission/crankshaft (section 11)

### SPECIFICATIONS

| Item | | Specifications |
|---|---|---|
| Engine dry weight | | 29 kg (64 lbs) |
| Engine oil capacity | At draining | 10 liter (1.06 US qt, 0.88 Imp qt) |
| | At disassembly | 1.2 liters (1.27 US qt, 1.06 Imp qt) |

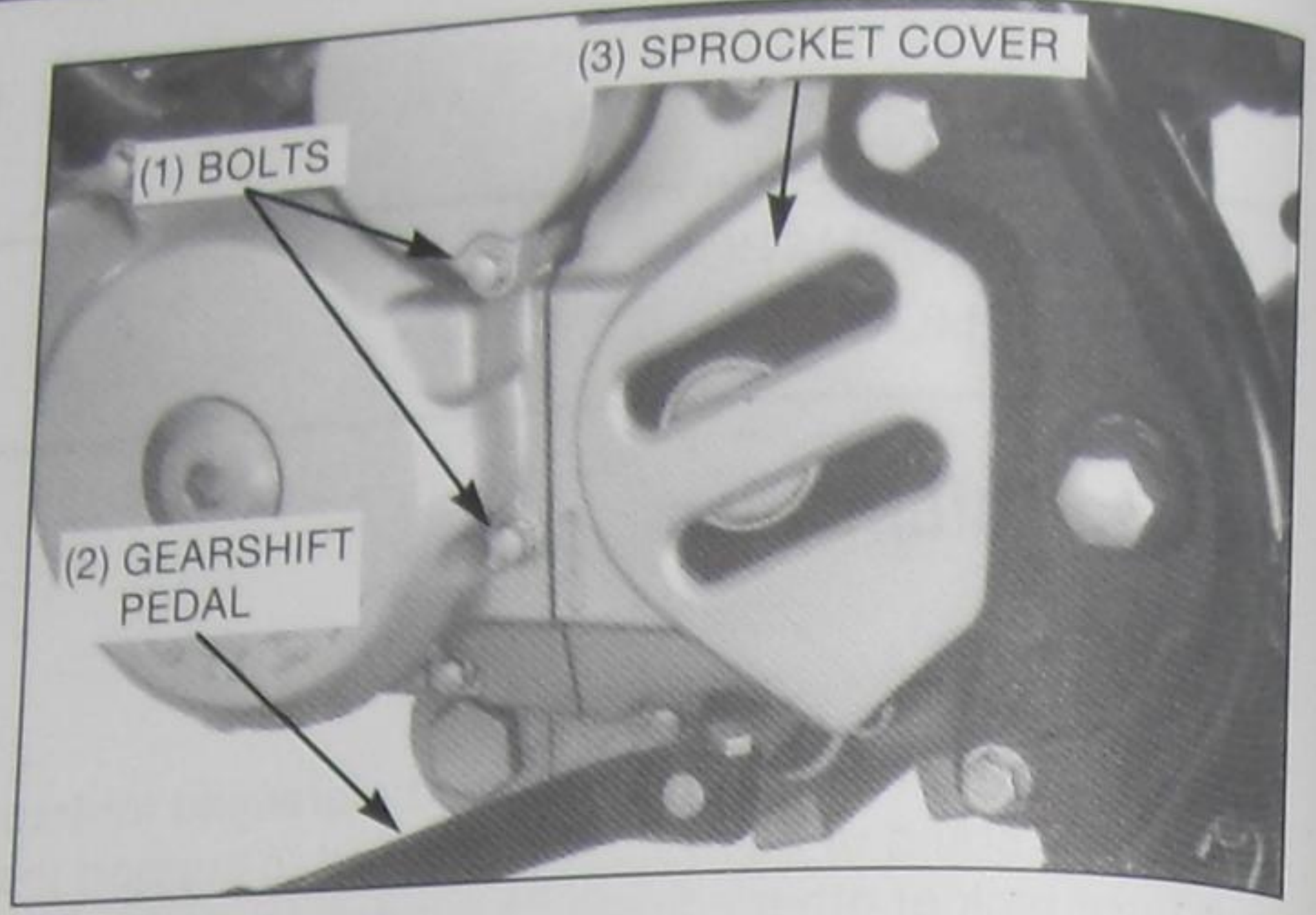
### TORQUE VALUES

| | | |
|---|---|---|
| Front engine hanger nut | 34 N·m (3.5 kgf-m, 25 lbf-ft) | |
| Upper engine hanger nut | 34 N·m (3.5 kgf-m, 25 lbf-ft) | |
| Rear upper engine mounting nut | 49 N·m (5.0 kgf-m, 36 lbf-ft) | |
| Rear lower engine mounting nut | 59 N·m (6.0 kgf-m, 43 lbf-ft) | |
| Drive sprocket bolt (IIG type) | 11 N·m (1.1 kg-fm, 8 lbf-ft) | One-way bolt: replace with a new one |
| Gearshift pedal bolt | 12 N·m (1.2 kgf-m, 9 lbf-ft) | |

## Engine Removal

Drain the engine oil (page 3-8).

Remove the following:
- Fuel tank (page 2-2)
- Side cover (page 2-3)
- Under guard (page 2-3)
- Exhaust system (page 2-4)
- Carburetor assembly (page 5-3)
- Brake pedal (page 13-10)

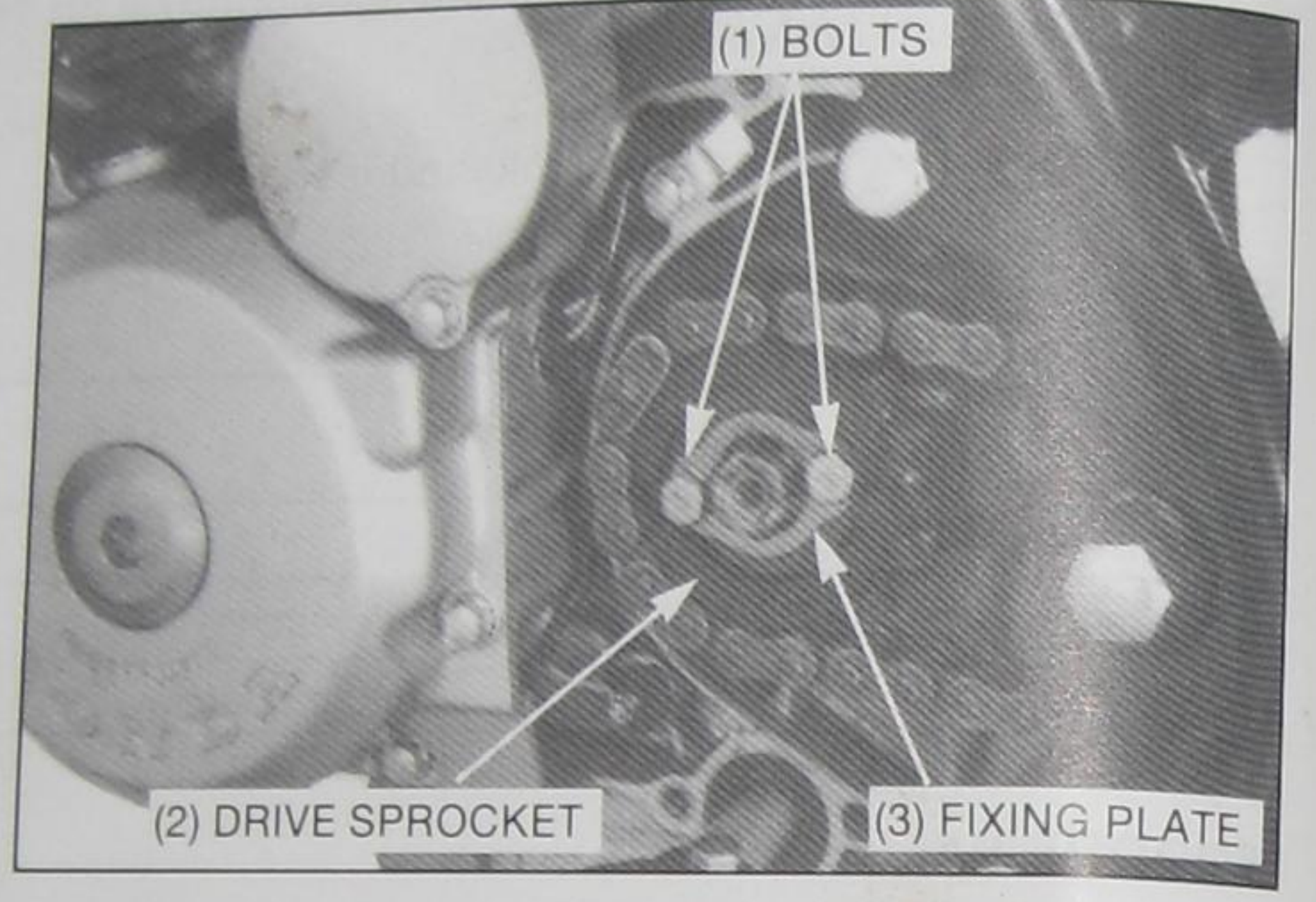

(3) SPROCKET COVER
(1) BOLTS
(2) GEARSHIFT PEDAL

Loosen the rear axle nut and turn the chain adjusters to loosen the drive chain (page 13-3).

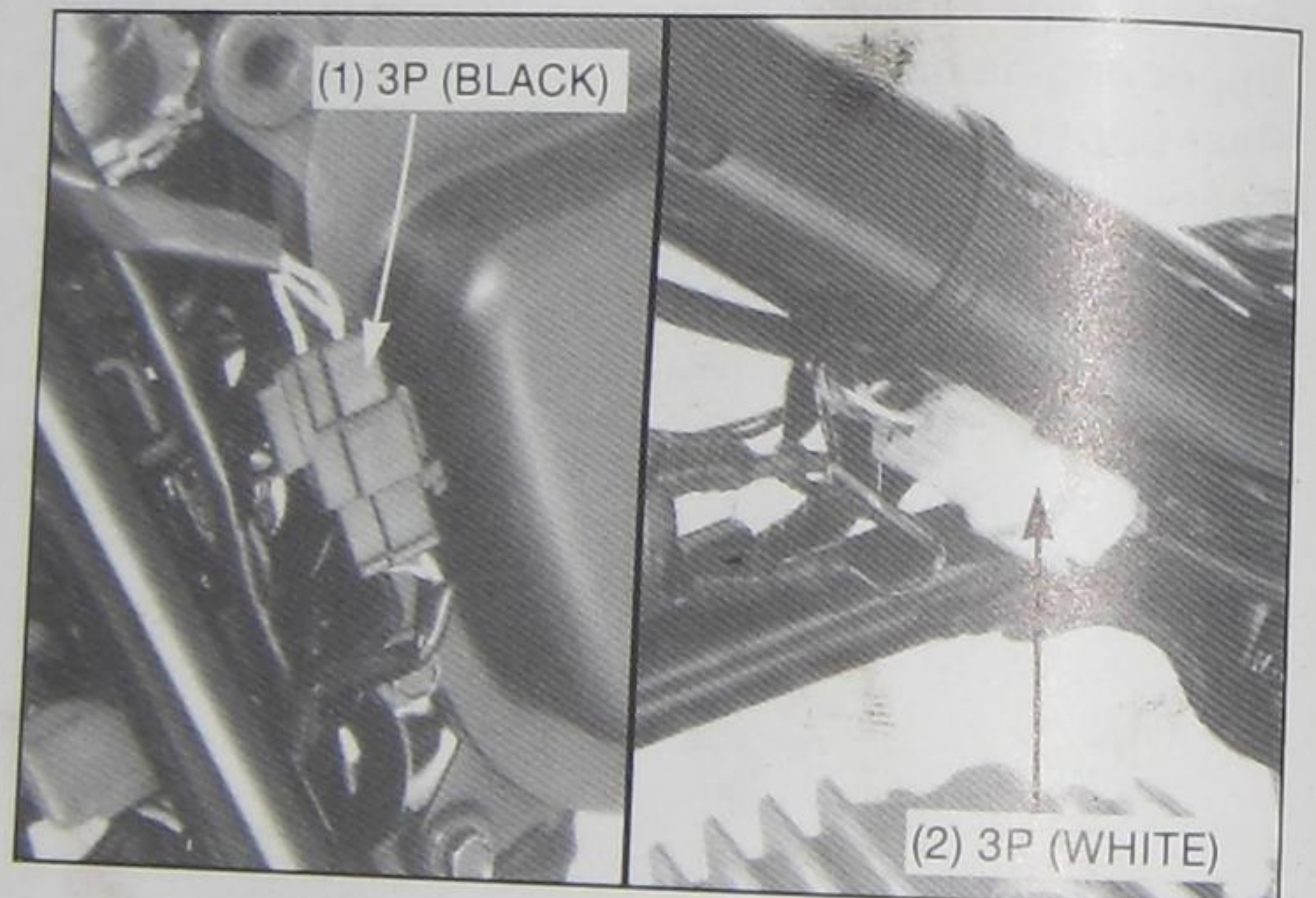
Remove the two bolts and the drive sprocket cover.

Remove the two fixing plate bolts.
Remove the fixing plate by aligning the splines of the plate and counter shaft.
Pull the drive sprocket off the countershaft and remove it from the drive chain.

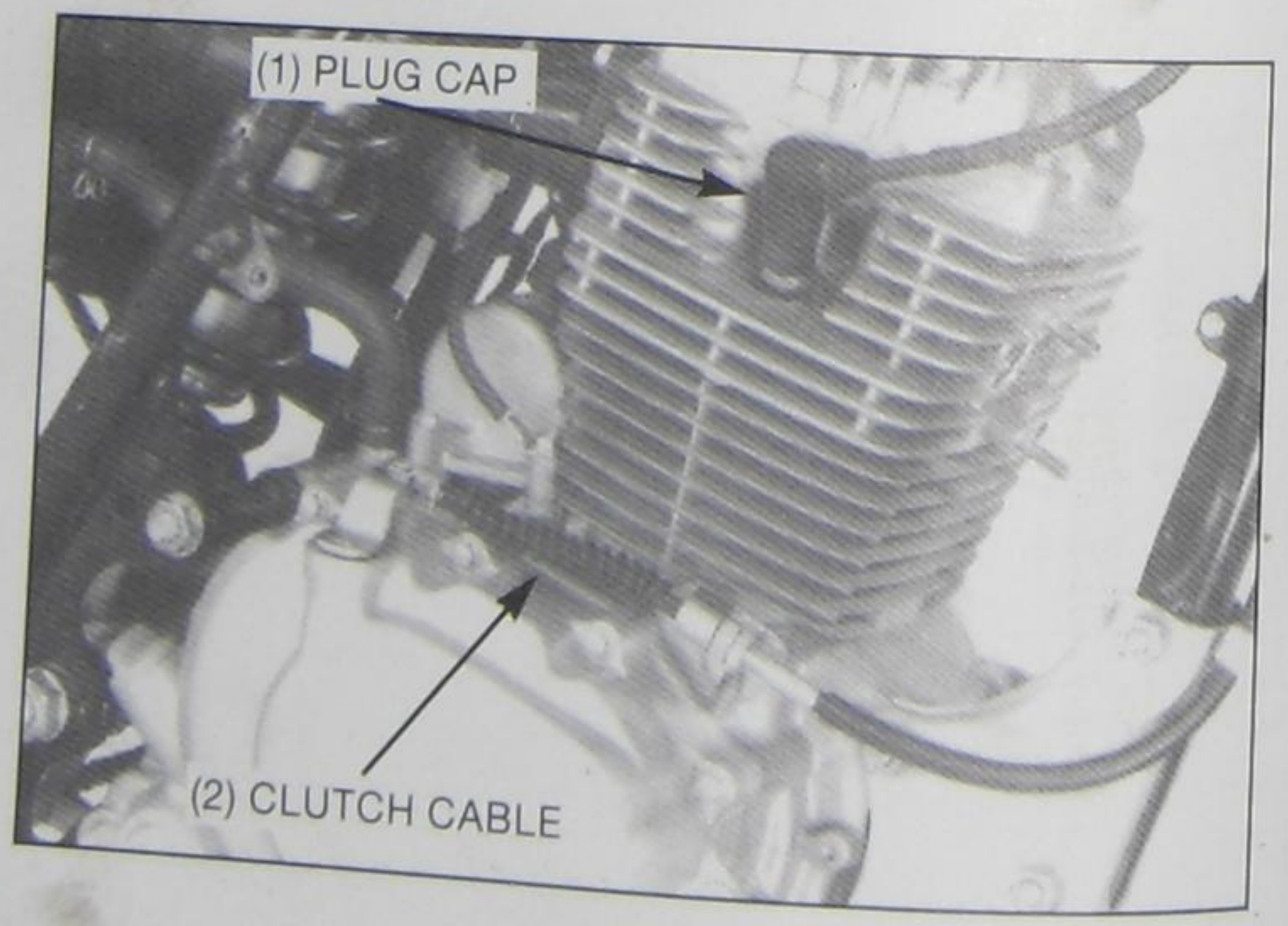
Remove the pinch bolt and the gearshift pedal.


(1) BOLTS
(2) DRIVE SPROCKET
(3) FIXING PLATE

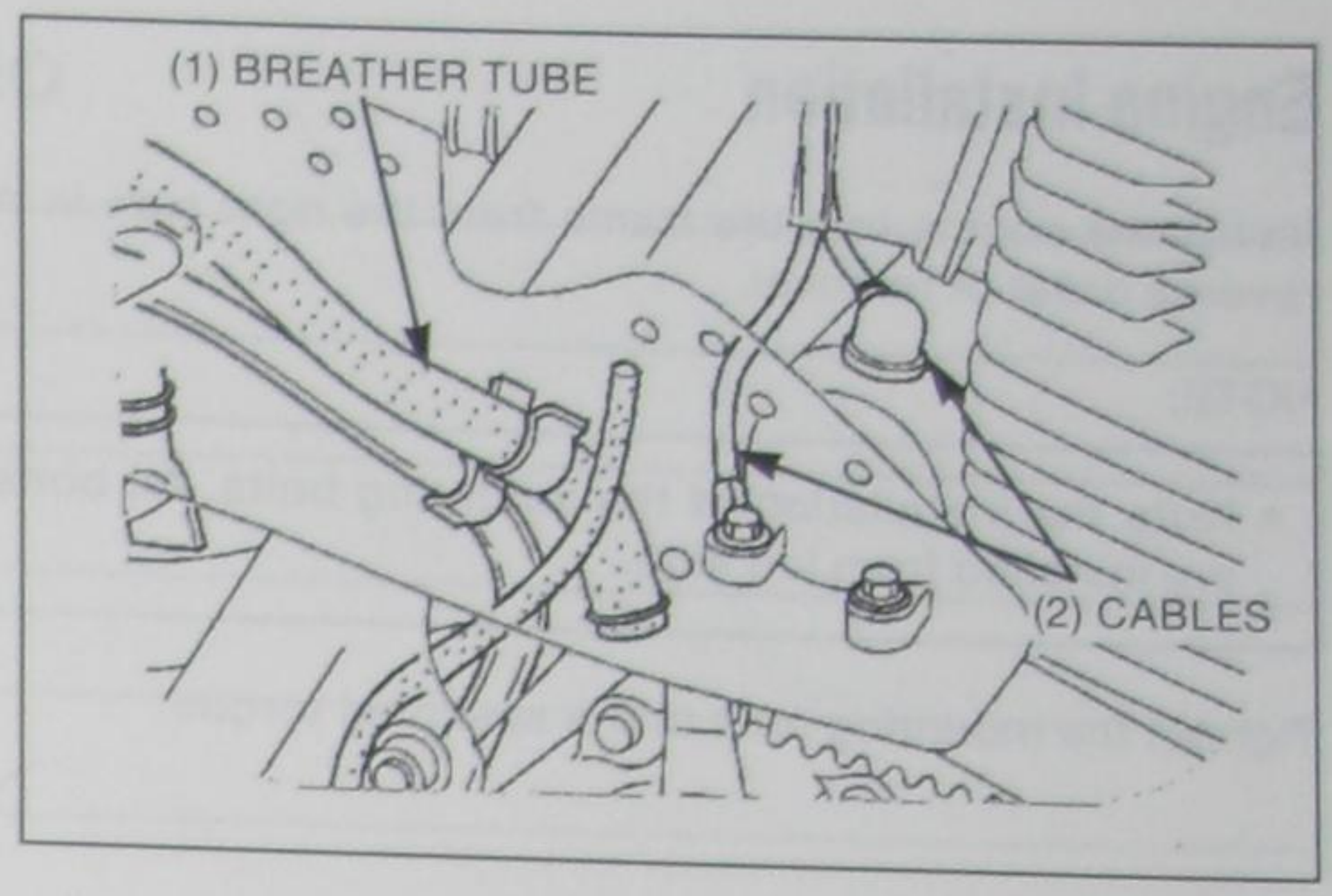
Disconnect the following:
- Alternator 3P (Black) connector
- Ignition pulse generator/neutral switch 3P (White) connector


(1) 3P (BLACK)
(2) 3P (WHITE)

- Spark plug cap
- Clutch cable

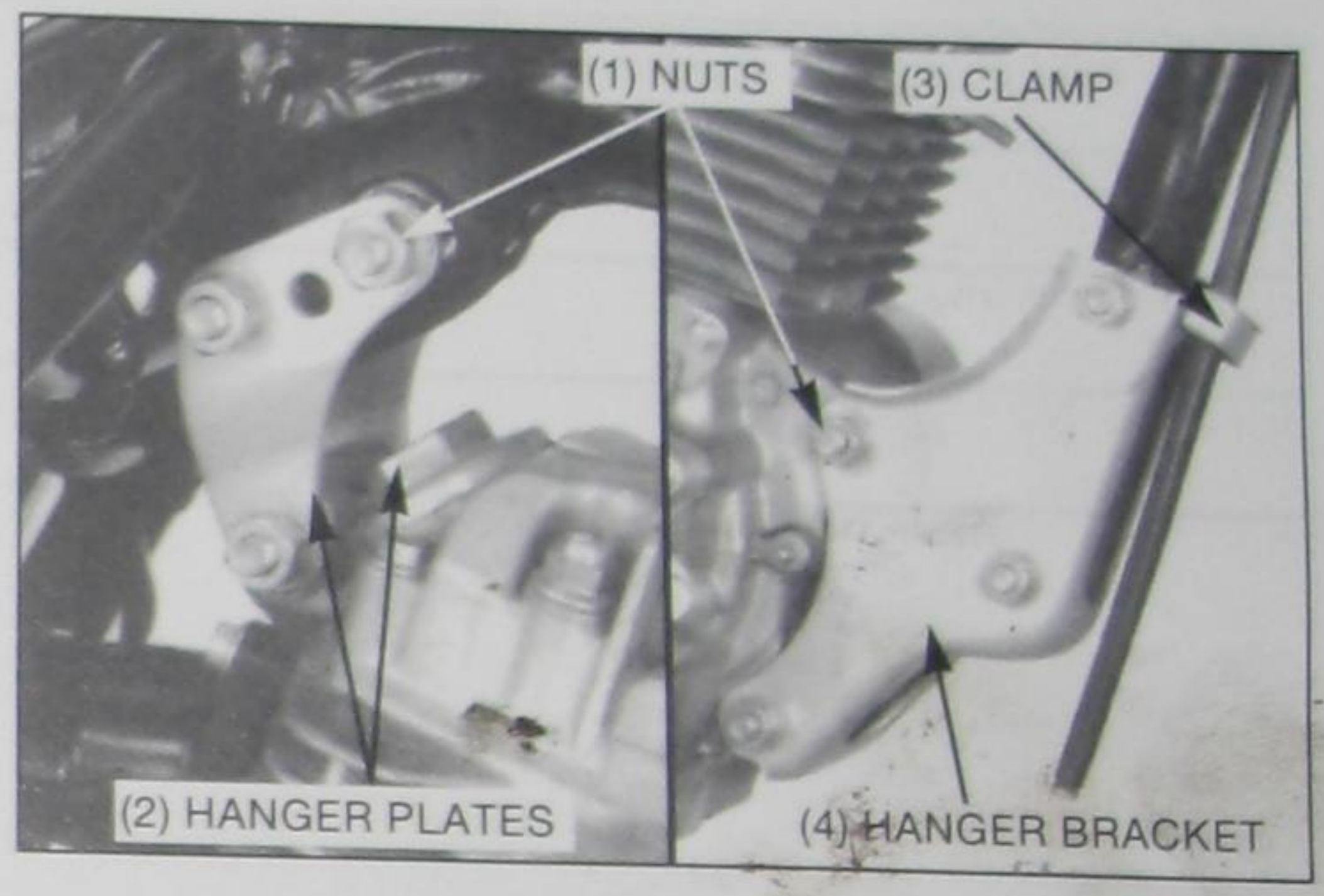

(1) PLUG CAP
(2) CLUTCH CABLE

- Crankcase breather tube
- Starter motor cable and ground cable

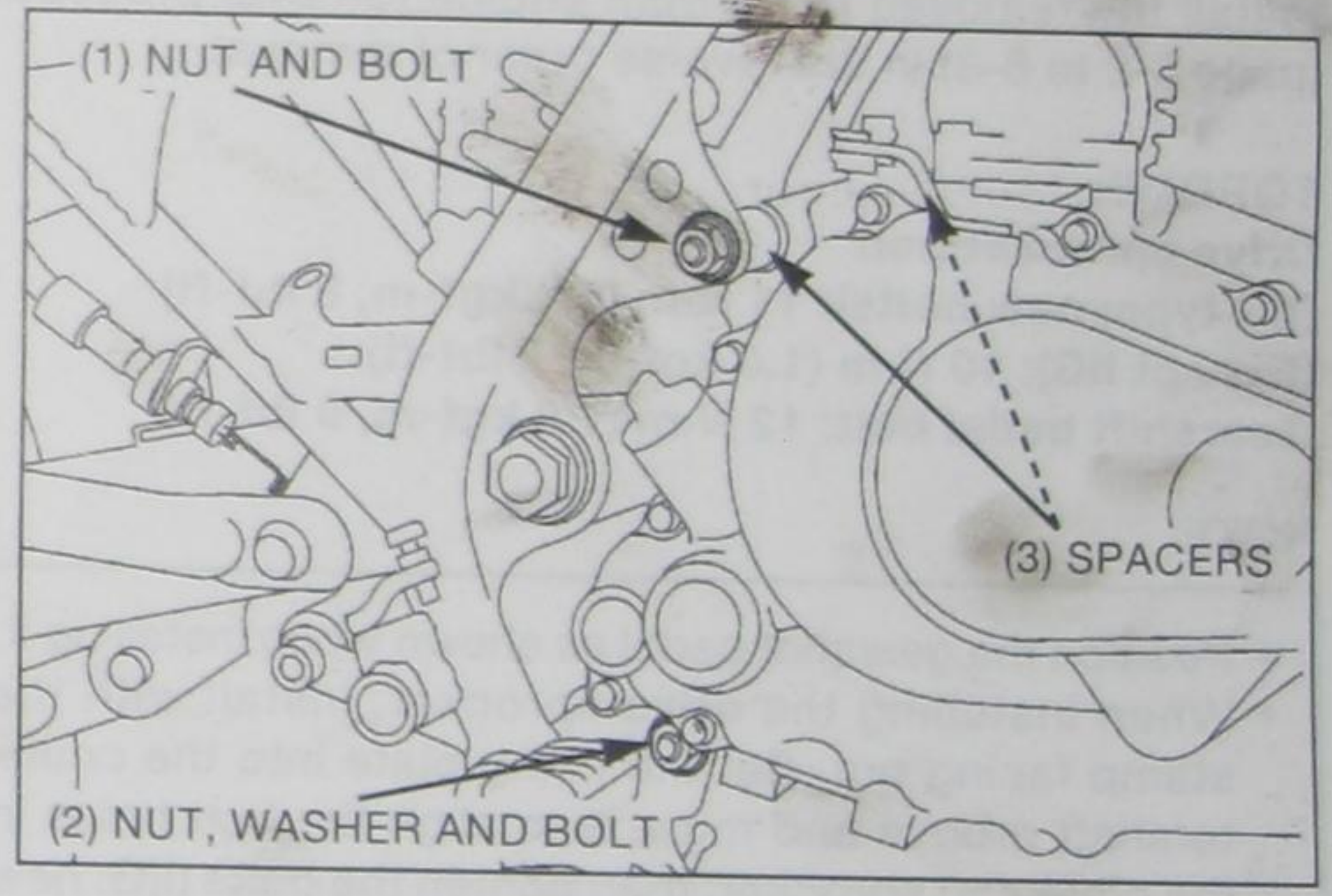

(1) BREATHER TUBE
(2) CABLES

Support the engine with a floor jack or other adjustable support.

Remove the following:
- Upper mounting nuts, bolts and hanger plates.
- Front mounting nuts, bolts and hanger bracket.
- Clutch cable from clamp


(1) NUTS
(3) CLAMP
(2) HANGER PLATES
(4) HANGER BRACKET

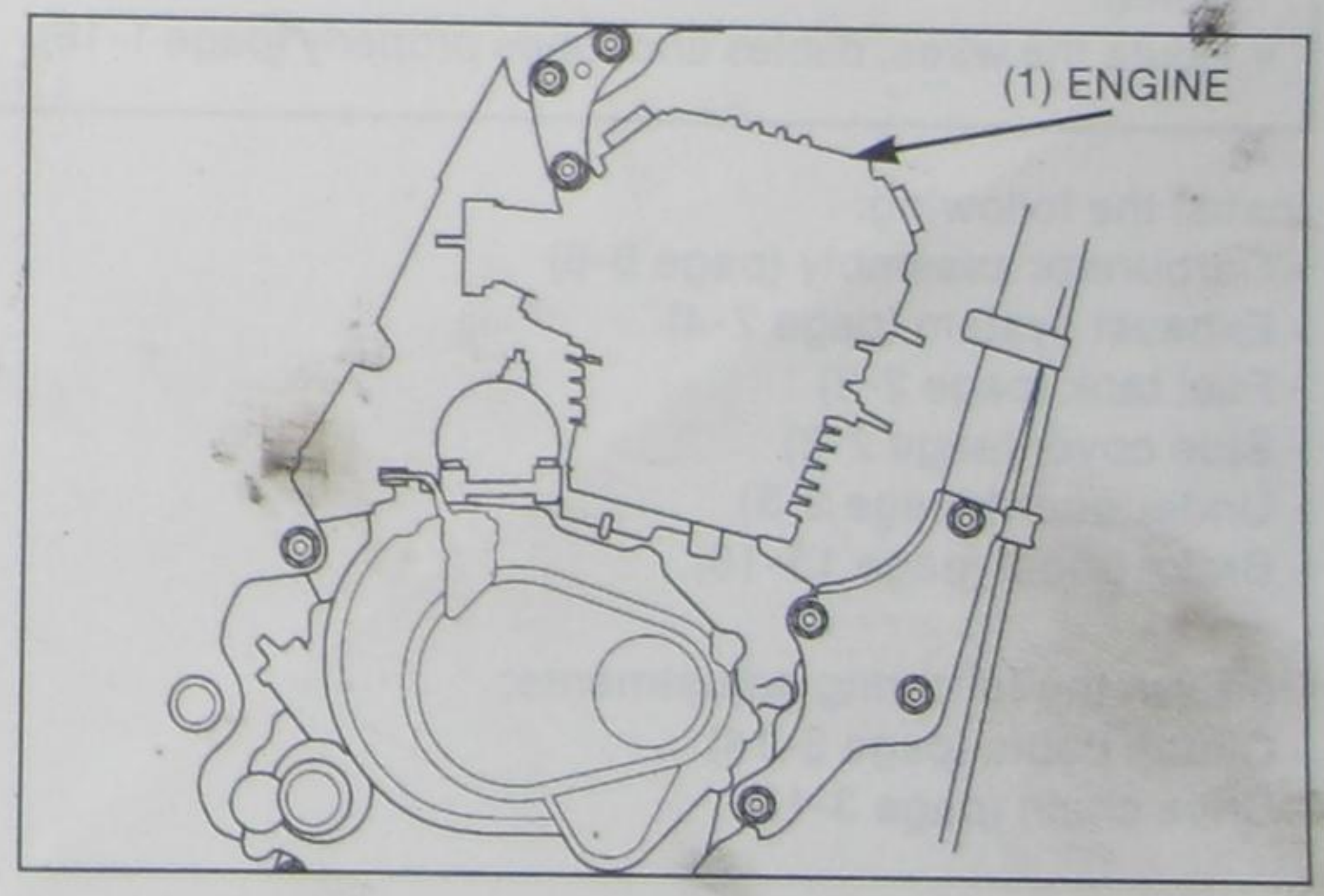
- Rear upper mounting nut, bolt and spacers (left: short/ right: long)
- Rear lower mounting nut, washer and bolt.


(1) NUT AND BOLT
(3) SPACERS
(2) NUT, WASHER AND BOLT

**CAUTION**

- **During engine assembly removal, hold the engine securely and be careful not to damage the frame and engine.**

Remove the engine out of the frame to the right.



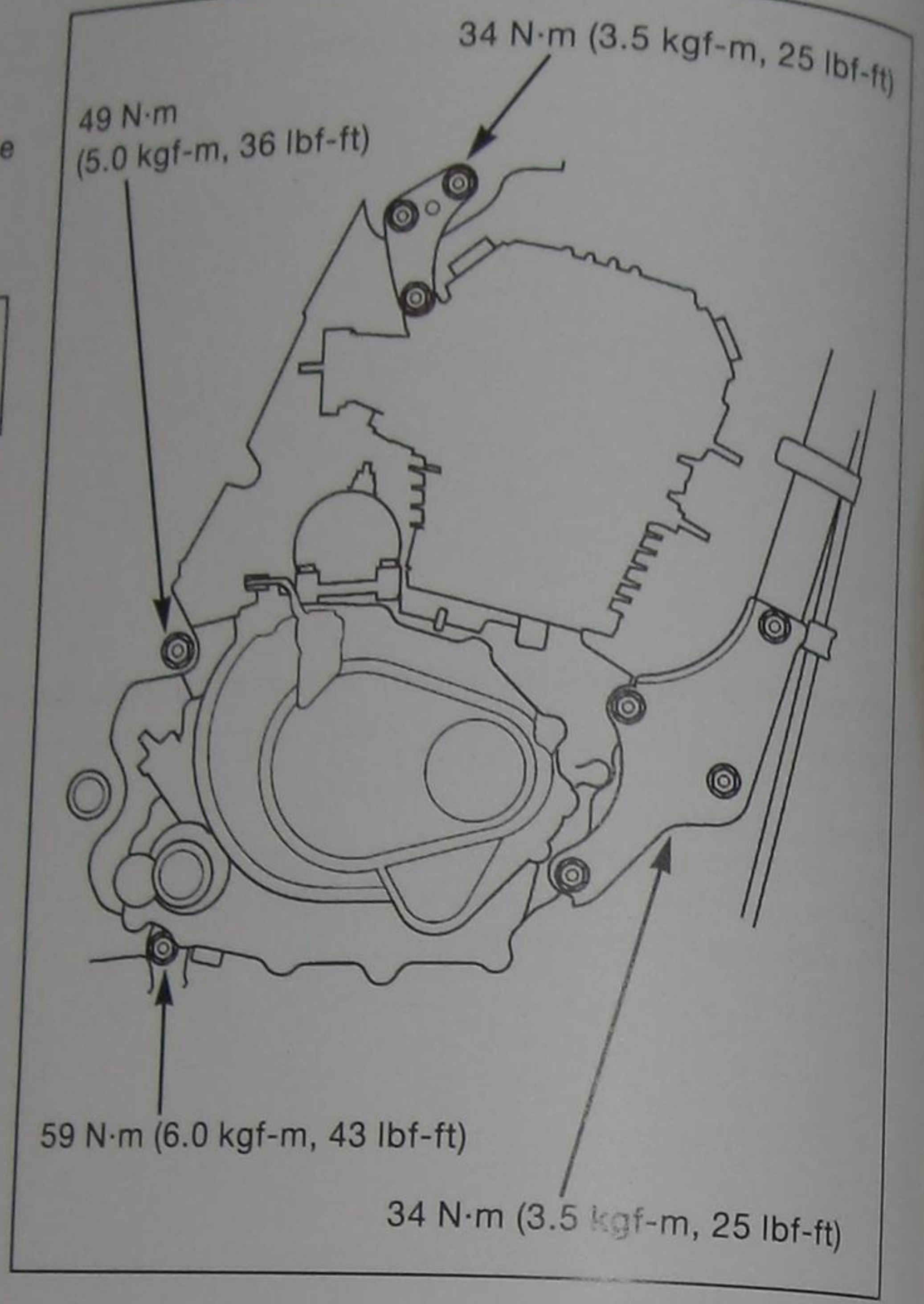
## Engine Installation

Install the engine into the frame from the right side in the reverse order of removal.

NOTE:

- Note the installation of the mounting bolts. All bolts are installed from left side.

Tighten the mounting nuts to the specified torque.

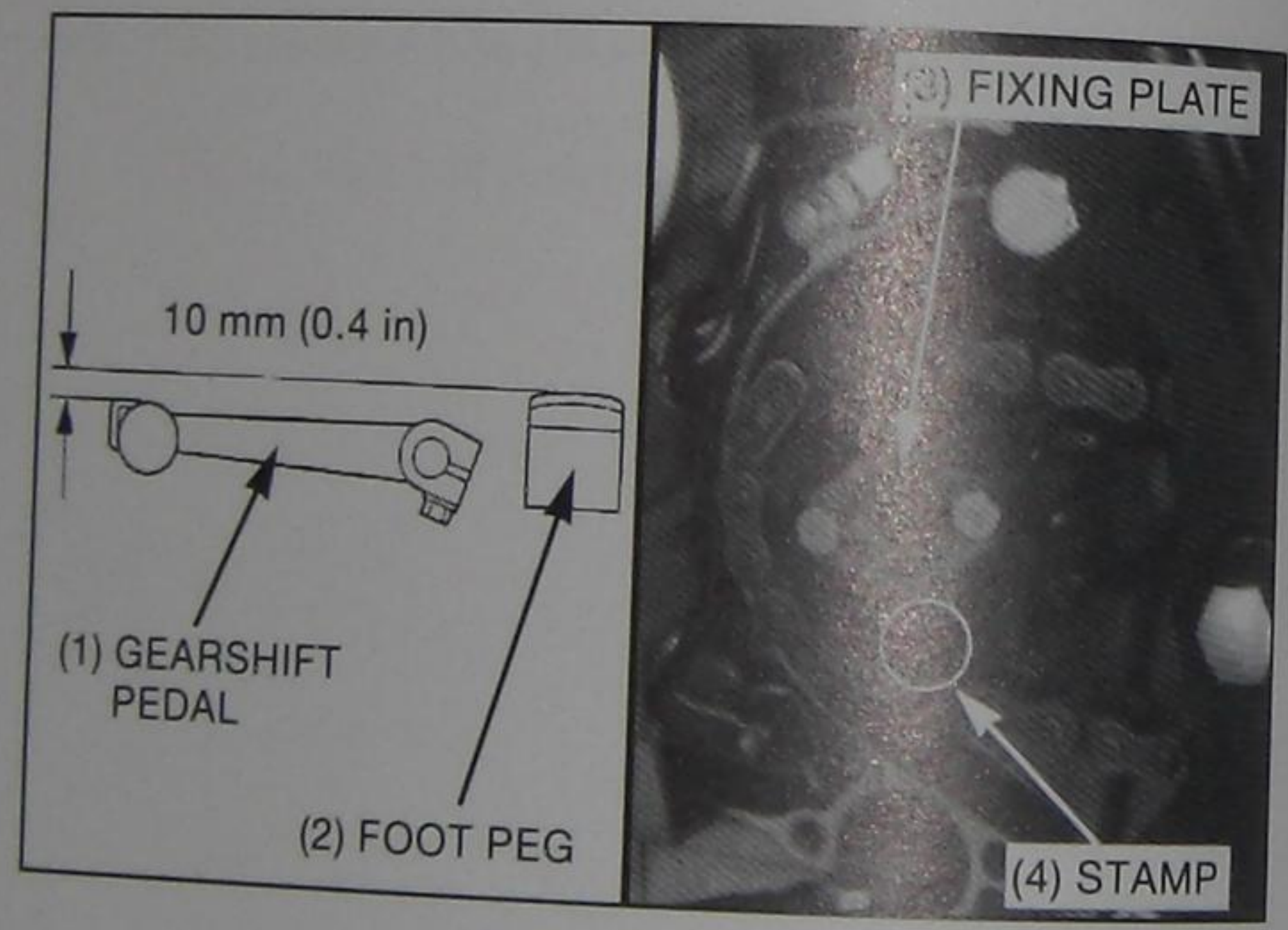

34 N·m (3.5 kgf-m, 25 lbf-ft)
49 N·m (5.0 kgf-m, 36 lbf-ft)
59 N·m (6.0 kgf-m, 43 lbf-ft)
34 N·m (3.5 kgf-m, 25 lbf-ft)

Install the removed parts from engine removal procedure (page 6-2 to 6-3) in the reverse order of removal.

**TORQUE:**
**Drive sprocket bolt**
**(IIG type; new bolts): 11 N·m (1.1 kgf-m, 8 lbf-ft)**
**(Except IIG): 10 N·m (1.0 kgf-m, 7 lbf-ft)**
**Gearshift pedal bolt: 12 N·m (1.2 kgf-m, 9 lbf-ft)**

NOTE:

- Position the gearshift pedal as shown when installing it.
- When installing the drive sprocket, install with the stamp facing out. Set the fixing plate into the countershaft groove and move it to align the bolt holes in the plate and sprocket, then tighten the bolts (IIG: new bolts).
- Route the wires, cables and tubes properly (page 1-16).

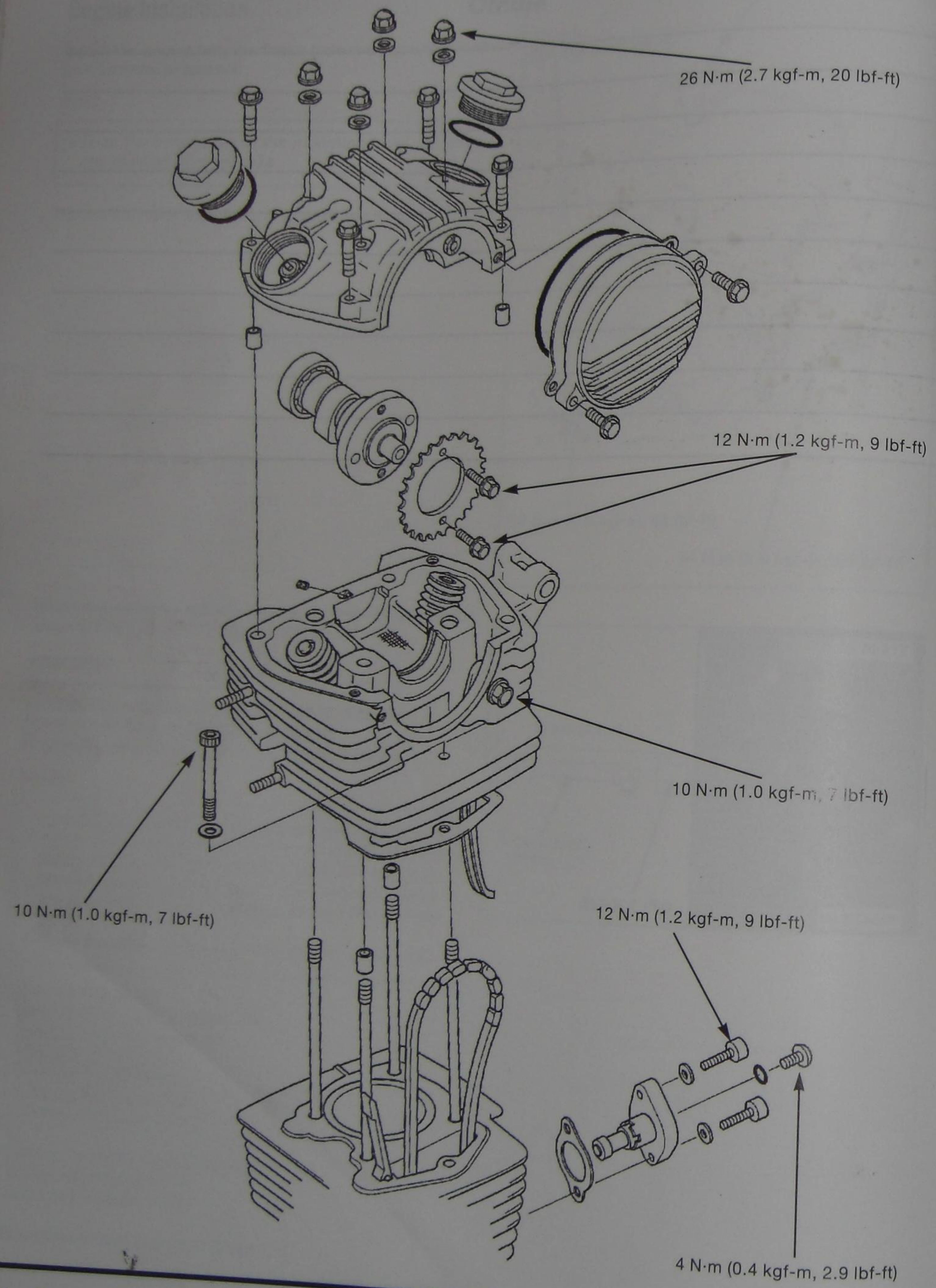

10 mm (0.4 in)
(1) GEARSHIFT PEDAL
(2) FOOT PEG
(3) FIXING PLATE
(4) STAMP

Install the following:
- Carburetor assembly (page 5-8)
- Exhaust system (page 2-4)
- Fuel tank (page 2-2)
- Side cover (page 2-3)
- Under guard (page 2-3)
- Brake pedal (page 13-10).

Perform the following adjustments:
- Clutch cable (page 3-14)
- Drive chain (page 3-10).

Fill recommended engine oil (page 3-8).

## MEMO


26 N·m (2.7 kgf-m, 20 lbf-ft)
12 N·m (1.2 kgf-m, 9 lbf-ft)
10 N·m (1.0 kgf-m, 7 lbf-ft)
10 N·m (1.0 kgf-m, 7 lbf-ft)
12 N·m (1.2 kgf-m, 9 lbf-ft)
4 N·m (0.4 kgf-m, 2.9 lbf-ft)

# 7. Cylinder Head/Valve

SERVICE INFORMATION 7-1
TROUBLESHOOTING 7-2
CYLINDER COMPRESSION 7-3
CYLINDER HEAD COVER/CAMSHAFT REMOVAL 7-3
CYLINDER HEAD REMOVAL 7-6
CYLINDER HEAD DISASSEMBLY 7-7
VALVE GUIDE REPLACEMENT 7-9
VALVE SEAT INSPECTION/REFACING 7-10
CYLINDER HEAD ASSEMBLY 7-13
CYLINDER HEAD INSTALLATION 7-14
CYLINDER HEAD COVER/CAMSHAFT INSTALLATION 7-15

## Service Information

### GENERAL

- This section covers service of the camshaft, rocker arms, cylinder head and valves. To service these parts, the engine must be removed from the frame.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed are before inspection.
- Camshaft and rocker arm lubricating oil is fed through oil passages in the cylinder head. Clean the oil passages before assembling cylinder head.
- Be careful not to damage the mating surfaces of the cylinder head cover and cylinder head.

### SPECIFICATIONS

Unit: mm (in)

| Item | | | Standard | Service Limit |
|---|---|---|---|---|
| Cylinder compression | | | 1,373 ± 98 kPa (14.0 ± 1.0 kgf/cm², 199 ± 14 psi) at 600 min⁻¹ (rpm) | — |
| Valve clearance | | IN | 0.10 ± 0.02 (0.004 ± 0.001) | — |
| | | EX | 0.10 ± 0.02 (0.004 ± 0.001) | — |
| Camshaft | Cam lobe height | IN | 31.402-31.582 (1.2363-1.2434) | 31.10 (1.224) |
| | | EX | 31.082-31.262 (1.2237-1.2308) | 30.70 (1.209) |
| | Runout | | — | 0.05 (0.002) |
| Cylinder head warpage | | | — | 0.10 (0.004) |
| Rocker arm | I.D | | 12.000-12.018 (0.4724-0.4731) | 12.05 (0.474) |
| | Shaft O.D | | 11.966-11.984 (0.4711-0.4718) | 11.93 (0.470) |
| | Rocker arm-to-shaft clearance | | 0.016-0.052 (0.0006-0.0020) | 0.08 (0.003) |
| Valve | Stem O.D | IN | 5.450-5.465 (0.2146-0.2052) | 5.42 (0.213) |
| | | EX | 5.430-5.445 (0.2138-0.2144) | 5.40 (0.213) |
| | Guide I.D | IN | 5.475-5.485 (0.2156-0.2159) | 5.50 (0.217) |
| | | EX | 5.475-5.485 (0.2156-0.2159) | 5.50 (0.217) |
| | Stem-to guide clearance | IN | 0.010-0.035 (0.0004-0.0014) | 0.08 (0.003) |
| | | EX | 0.030-0.055 (0.0012-0.0022) | 0.10 (0.004) |
| | Spring free length | Outer | 44.9 (1.77) | 43.5 (1.71) |
| | | Inner | 39.2 (1.54) | 38.0 (1.50) |
| Valve seat width | | | 1.1-1.3 (0.04-0.05) | 1.5 (0.06) |

### TORQUE VALUES

| | | |
|---|---|---|
| Cam chain tensioner slider pivot bolt | 10 N·m (1.0 kgf-m, 7 lbf-ft) | |
| Cam sprocket bolt | 12 N·m (1.2 kgf-m, 9 lbf-ft) | |
| Cylinder head cover cap nut | 26 N·m (2.7 kgf-m, 20 lbf-ft) | Apply oil to the threads and seating surface. |
| Cylinder head socket bolt | 10 N·m (1.0 kgf-m, 7 lbf-ft) | |
| Cam chain tensioner mounting bolt | 12 N·m (1.2 kgf-m, 9 lbf-ft) | |
| Cam chain tensioner sealing screw | 4 N·m (0.4 kgf-m, 2.9 lbf-ft) | |

### TOOLS

| | |
|---|---|
| Valve spring compressor | 07757-0010000 |
| Valve guide driver, 5.5 mm | 07742-0010100 |
| Valve guide reamer | 07984-0980001 |
| Seat cutter, 33 mm (45° IN) | 07780-0010800 |
| Seat cutter, 27.5 mm (45° EX) | 07780-0010200 |
| Flat cutter, 33 mm (32° IN) | 07780-0012900 |
| Flat cutter, 30 mm (32° EX) | 07780-0012200 |
| Interior cutter, 30mm (60° IN/EX) | 07780-0014000 |
| Cutter holder, 5.5 mm | 07781-0010101 |

## Troubleshooting

Engine top-end problems usually affect engine performance. These can be diagnosed by a compression test, or by tracing top-end noises with a sounding rod or stethoscope.

**Compression too low, hard starting or poor performance at low speed.**
- Valves
  - Incorrect valve clearance
  - Burned or bent valve
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
- Cylinder head
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
  - Loose spark plug
- Cylinder/piston (section 8)

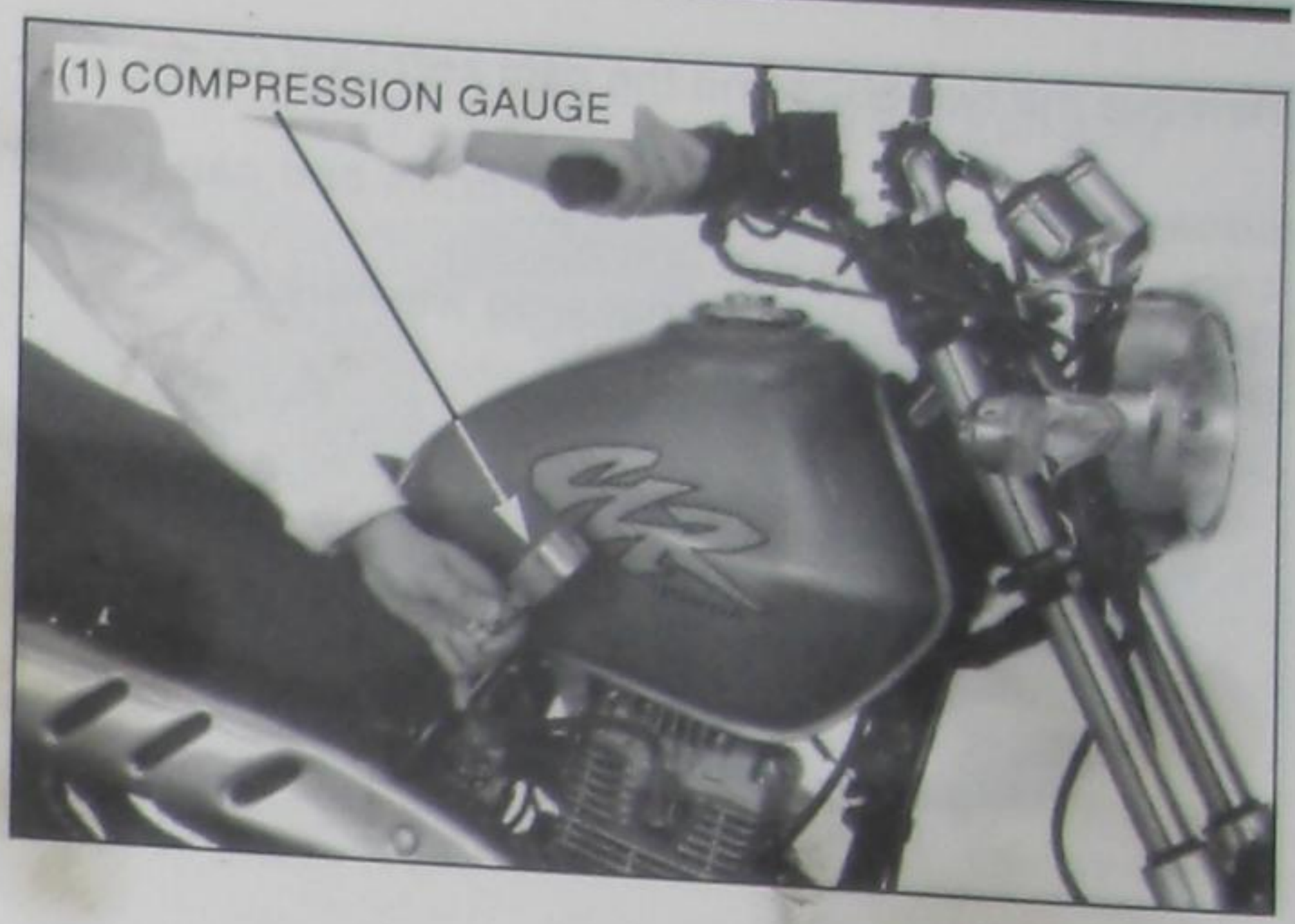
**Compression too high**
- Excessive carbon built-up on piston or combustion chamber.

**Excessive smoke**
- Worn valve stem or valve guide
- Damaged stem seal
- Cylinder/piston problem (section 8)

**Excessive noise**
- Incorrect valve clearance
- Sticking valve or broken valve spring
- Worn or damaged camshaft
- Worn or damaged rocker arm and/or shaft
- Worn or damaged cam sprocket teeth
- Worn cam chain
- Worn or damaged cam chain tensioner
- Worn cam sprocket teeth
- Cylinder/piston problem (section 8)

**Rough idle**
- Low cylinder compression

## Cylinder Compression



Warm up the engine to normal operating temperature. Stop the engine and remove the spark plug cap and park plug.

Install the compression gauge into the spark plug hole. Shift the transmission in neutral and open the choke lever (OFF).
Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising. The maximum reading is usually reached within 4-7 seconds.

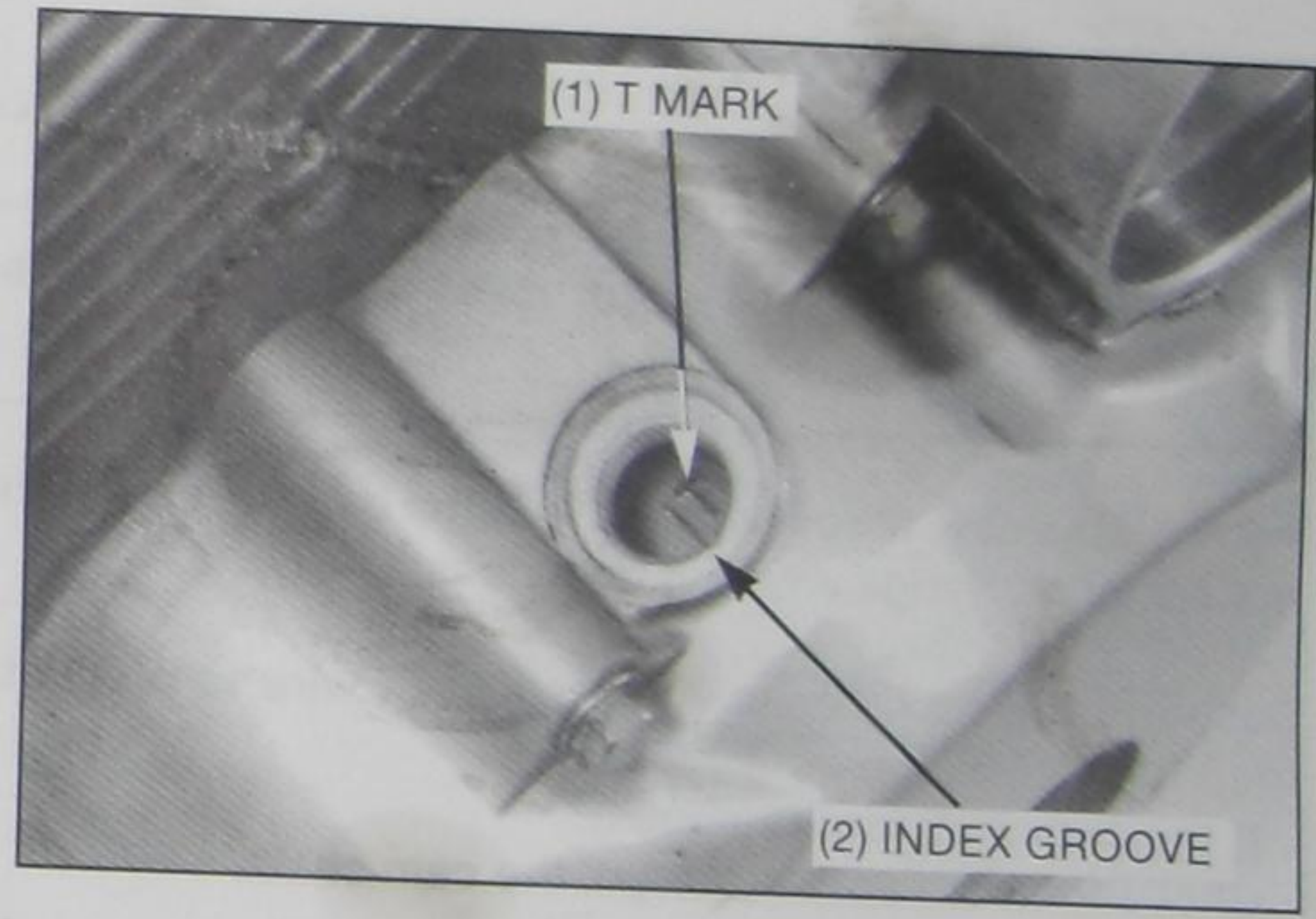
**COMPRESSION PRESSURE:**
**1,373 ± 98 kPa (14.0 ± 1.0 kgf/cm², 199 ± 14 psi) at 600 min⁻¹ (rpm)**

If compression is high, it indicates that carbon deposits have accumulated on the combustion chamber or the piston crown.

If compression is low, pour 3-5 cm³ (0.1-0.2 oz) of clean engine oil into the cylinder through the spark plug hole and recheck the compression.
If the compression increases from the previous value, check the cylinder, piston and piston ring.
If compression is the same as the previous value, check the valves and cylinder head for leakage.

## Cylinder Head Cover/Camshaft Removal

### HEAD COVER REMOVAL

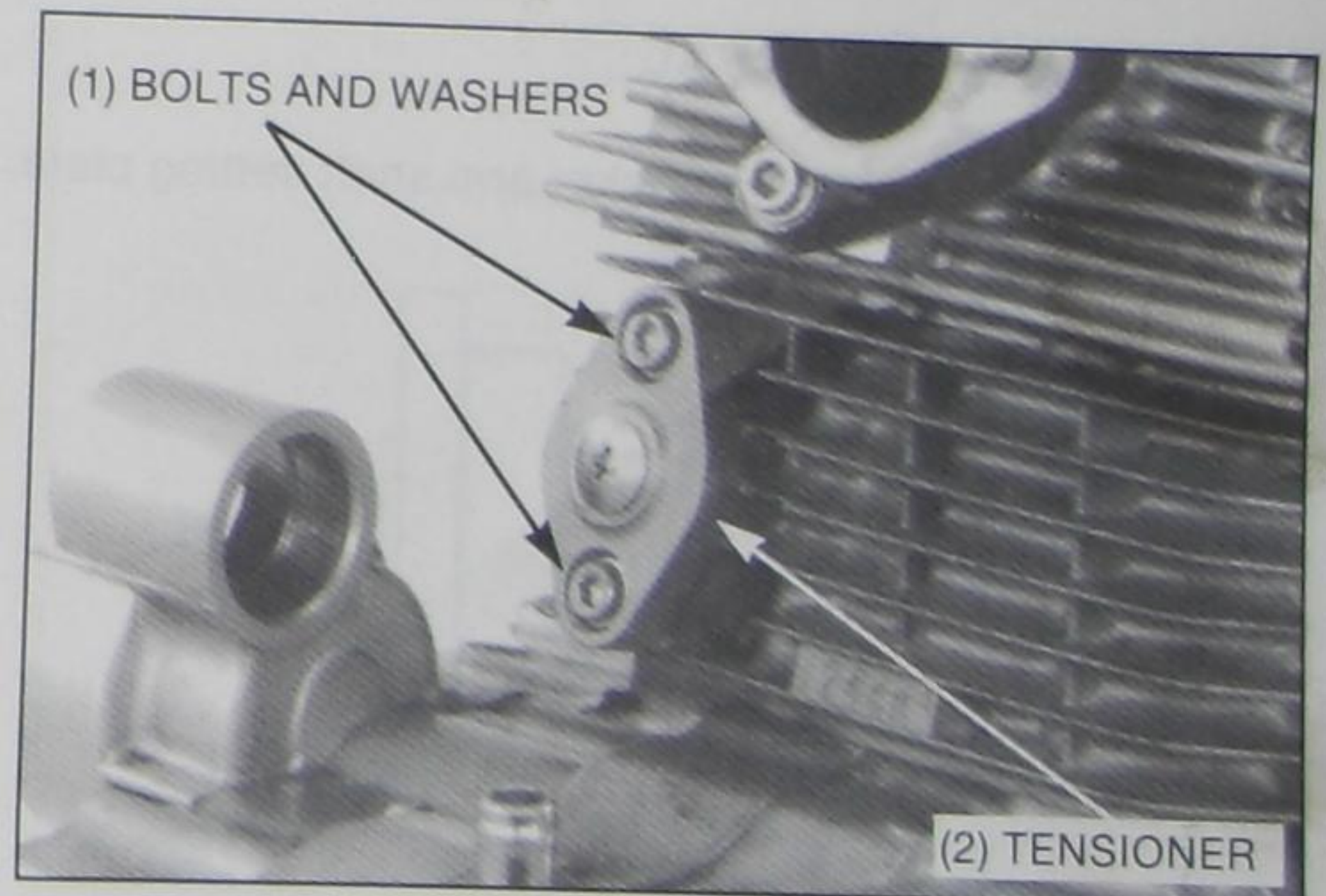


Remove the engine from the frame (section 7).

Remove the starter motor (page 17-4).

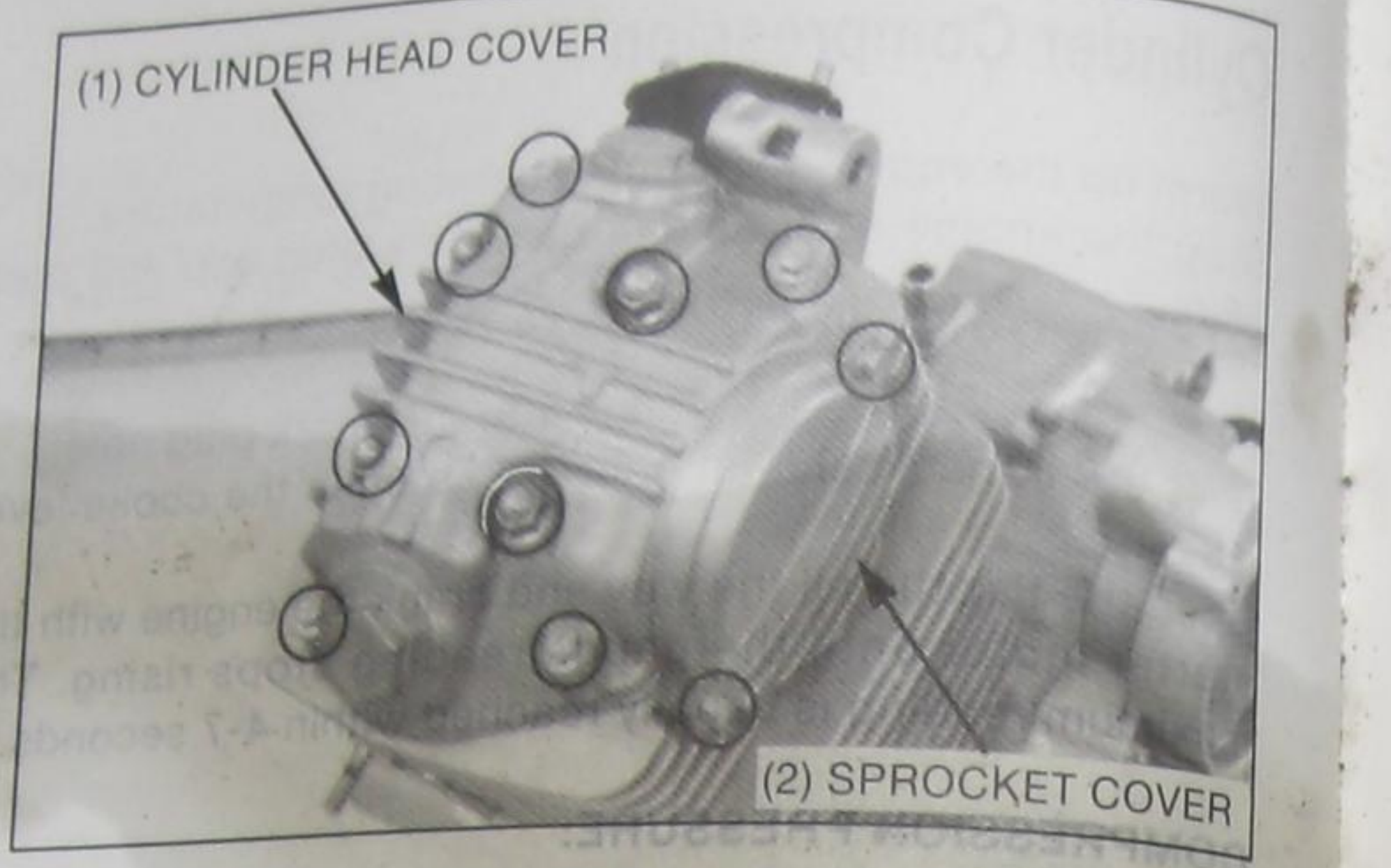
Remove the timing hole and crankshaft hole caps.
Rotate the crankshaft counterclockwise to align the T mark on the flywheel with the index groove in the crankcase cover.
Remove the valve hole cap. Make sure the piston is at TDC (Top Dead Center) on the compression stroke.
This position can be obtained by confirming that there is slack in the rocker arm. If there is no slack, it is because the piston is moving through the exhaust stroke to TDC. Rotate the crankshaft one full turn counterclockwise and match up the T mark again.

Remove the cam chain tensioner by loosening the two bolts alternately.

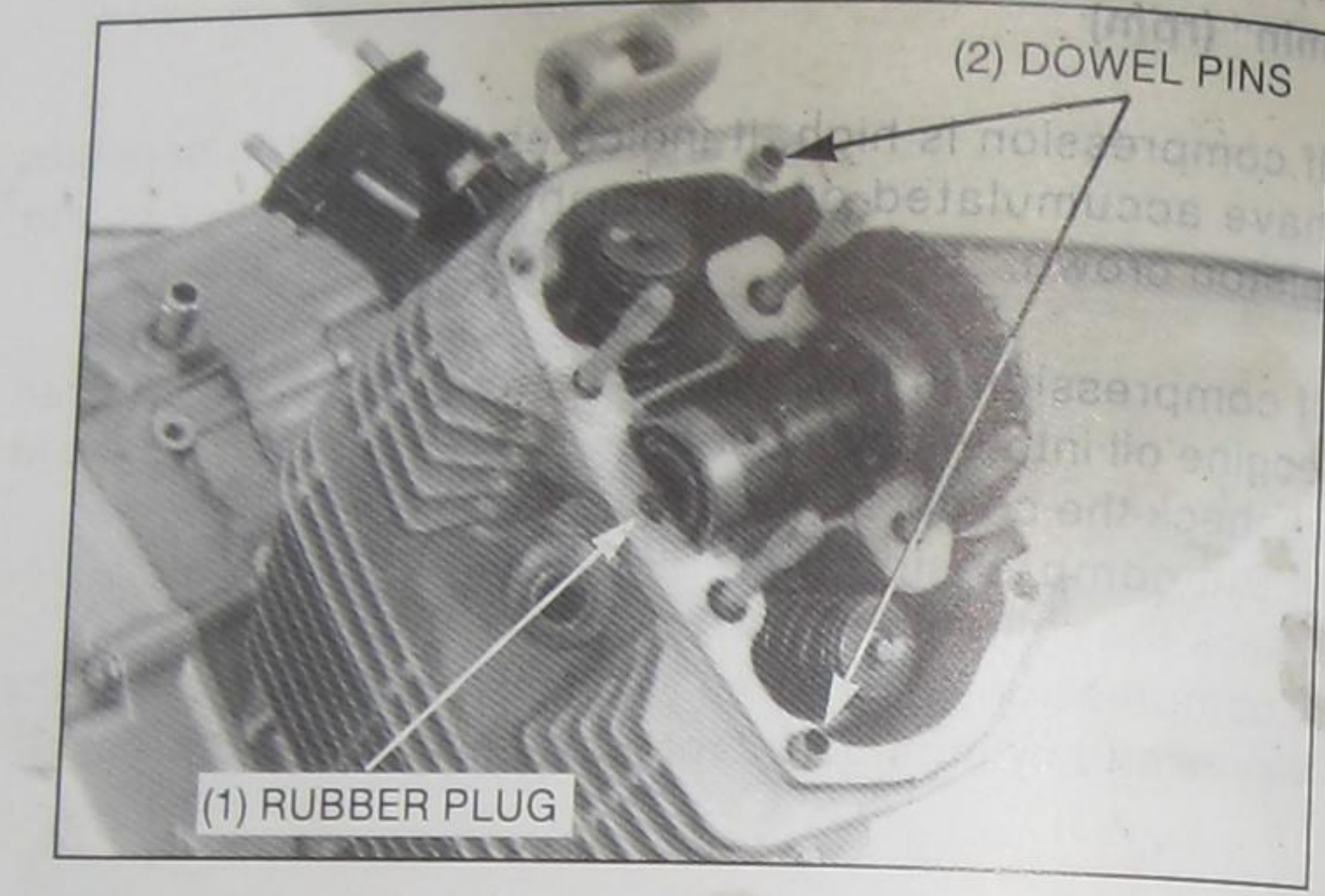


Remove the two bolts and the cam sprocket cover.

Loosen the cylinder head cover bolts and cap nuts in a crisscross pattern in 2 or 3 steps.
Remove the bolts, nuts and sealing washers.
Remove the cylinder head cover.



Remove the rubber plug and dowel pins.



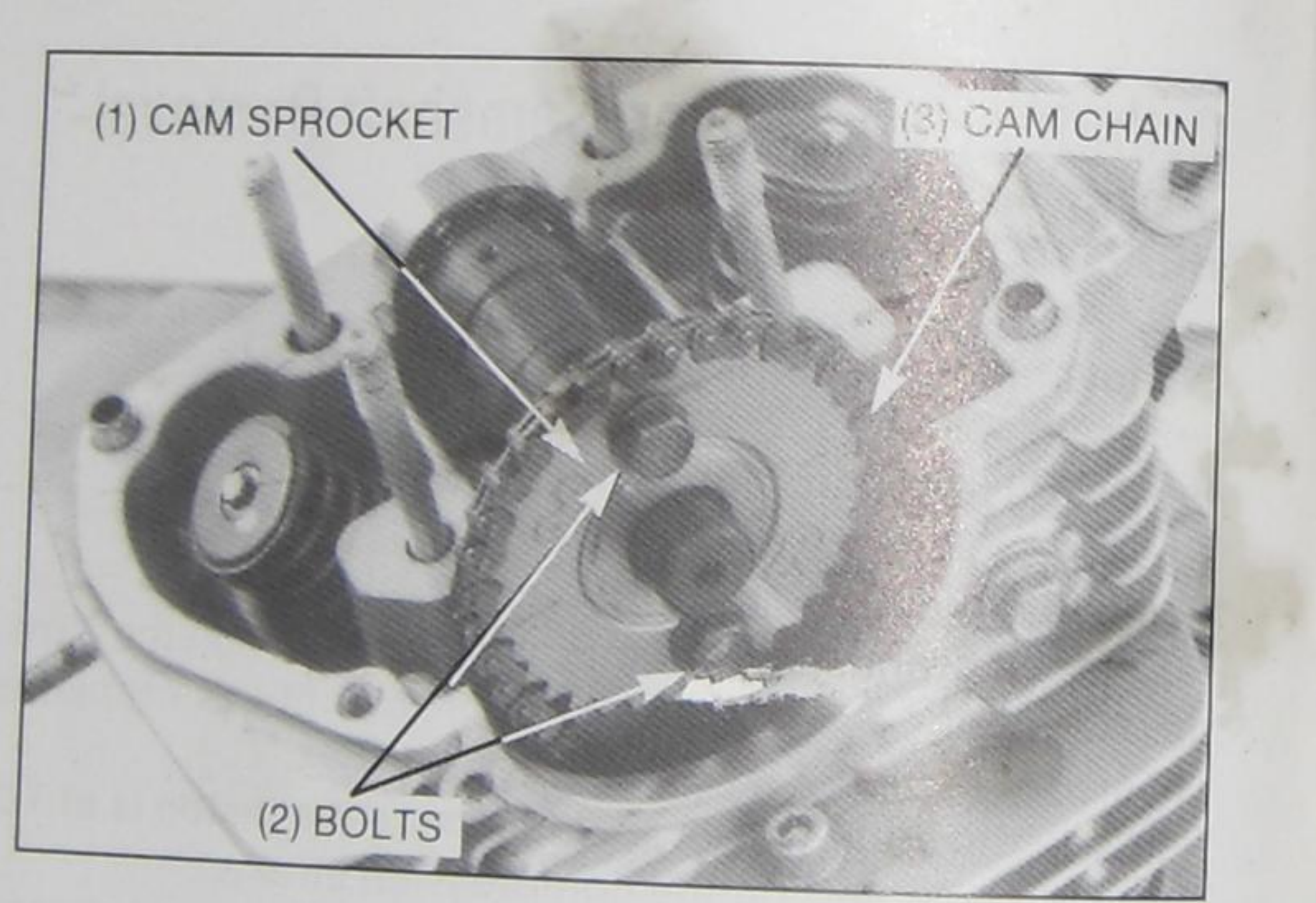
**CAMSHAFT REMOVAL**

NOTE:

- Be careful not to let the sprocket bolts fall into the crankcase.

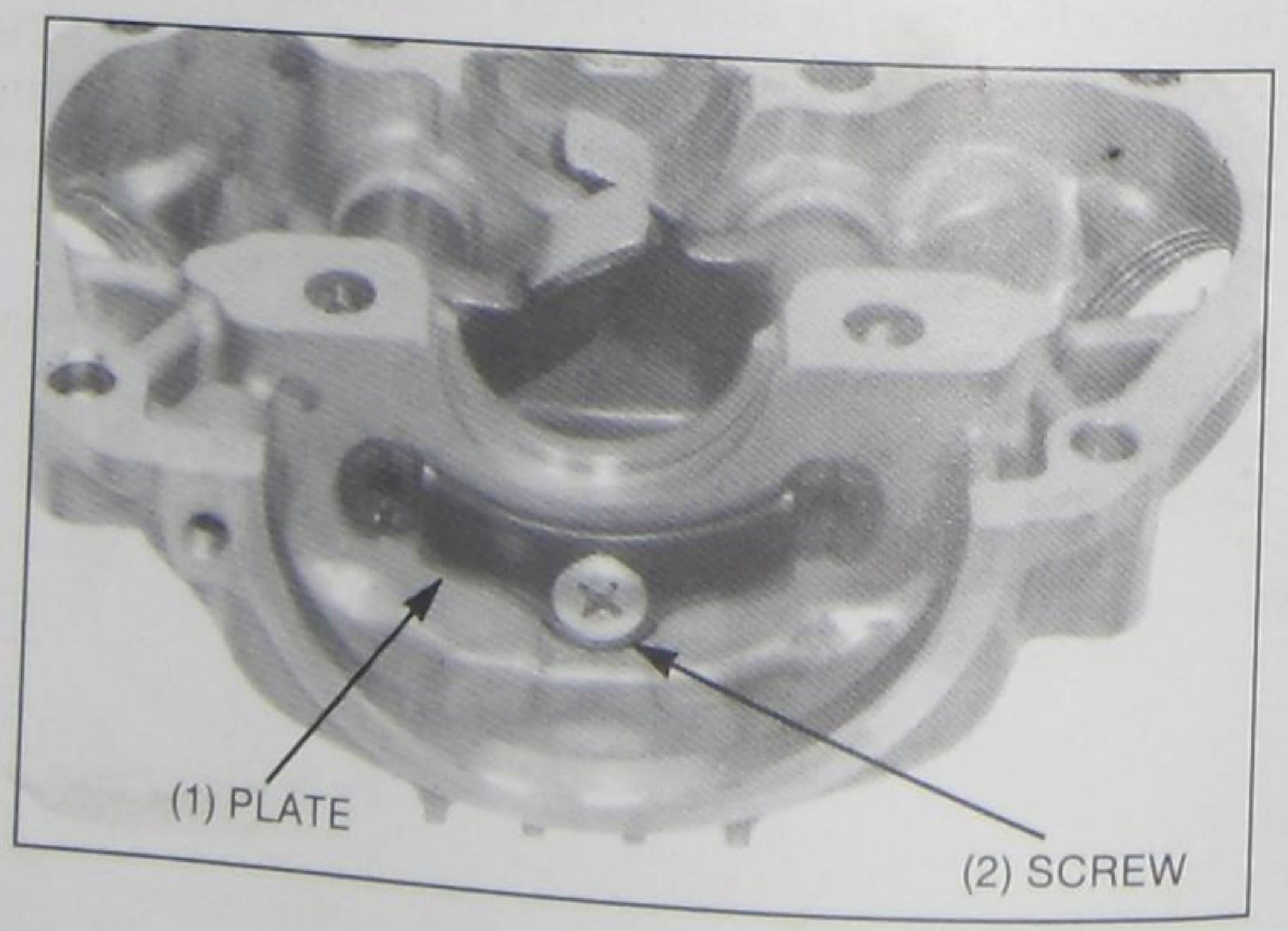
Remove the cam sprocket bolts and the cam sprocket from the camshaft flange with the cam chain.

Suspend the cam chain with a piece of wire to prevent it from falling into the crankcase.
Lift the camshaft and remove it.
Remove the cam sprocket from the cam chain.

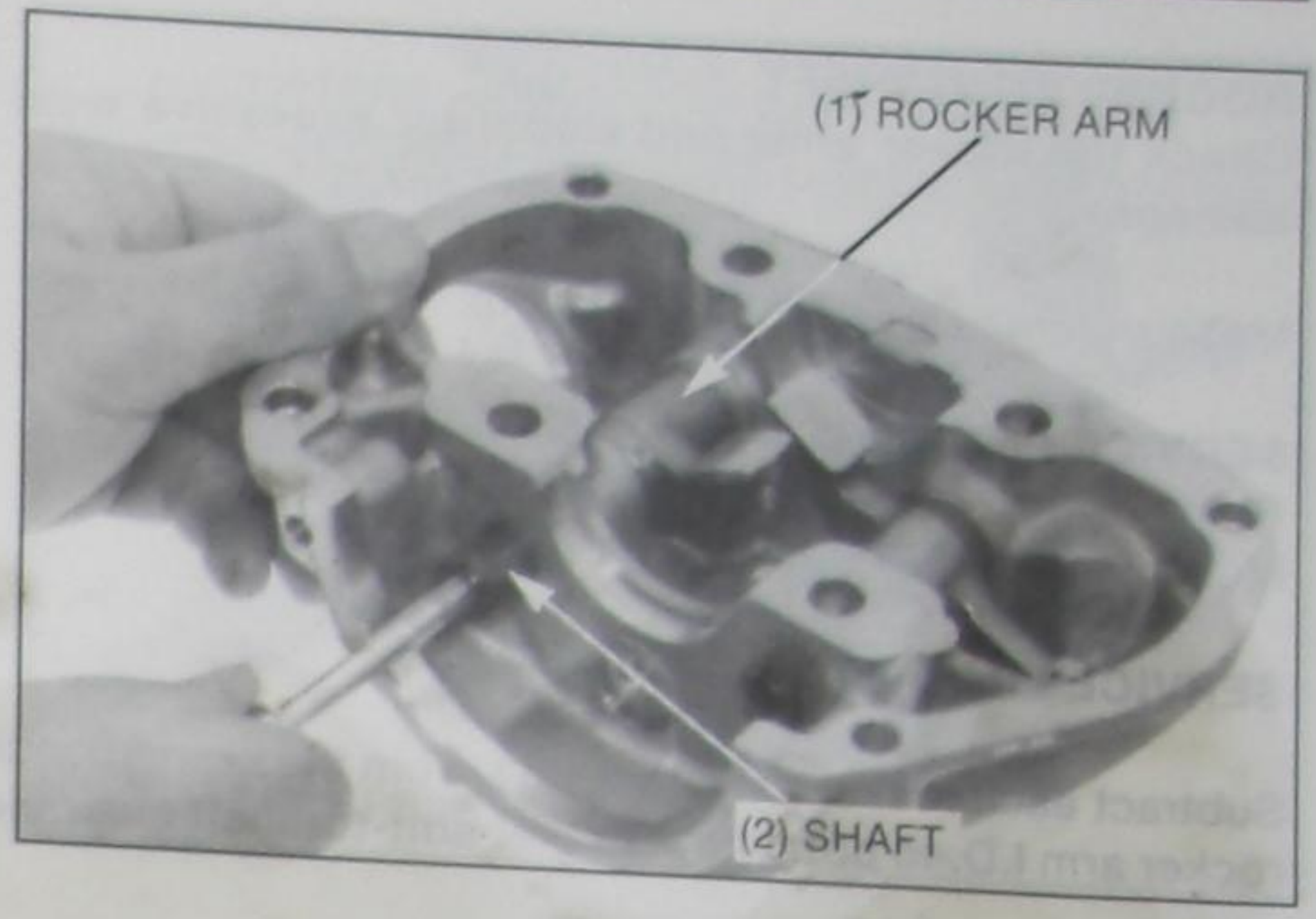


**ROCKER ARM REMOVAL**

Remove the screw and the rocker arm shaft setting plate.



Thread a 6 mm bolt into the rocker arm shaft, and pull it out and remove the rocker arm shaft and rocker arm.



**INSPECTION**

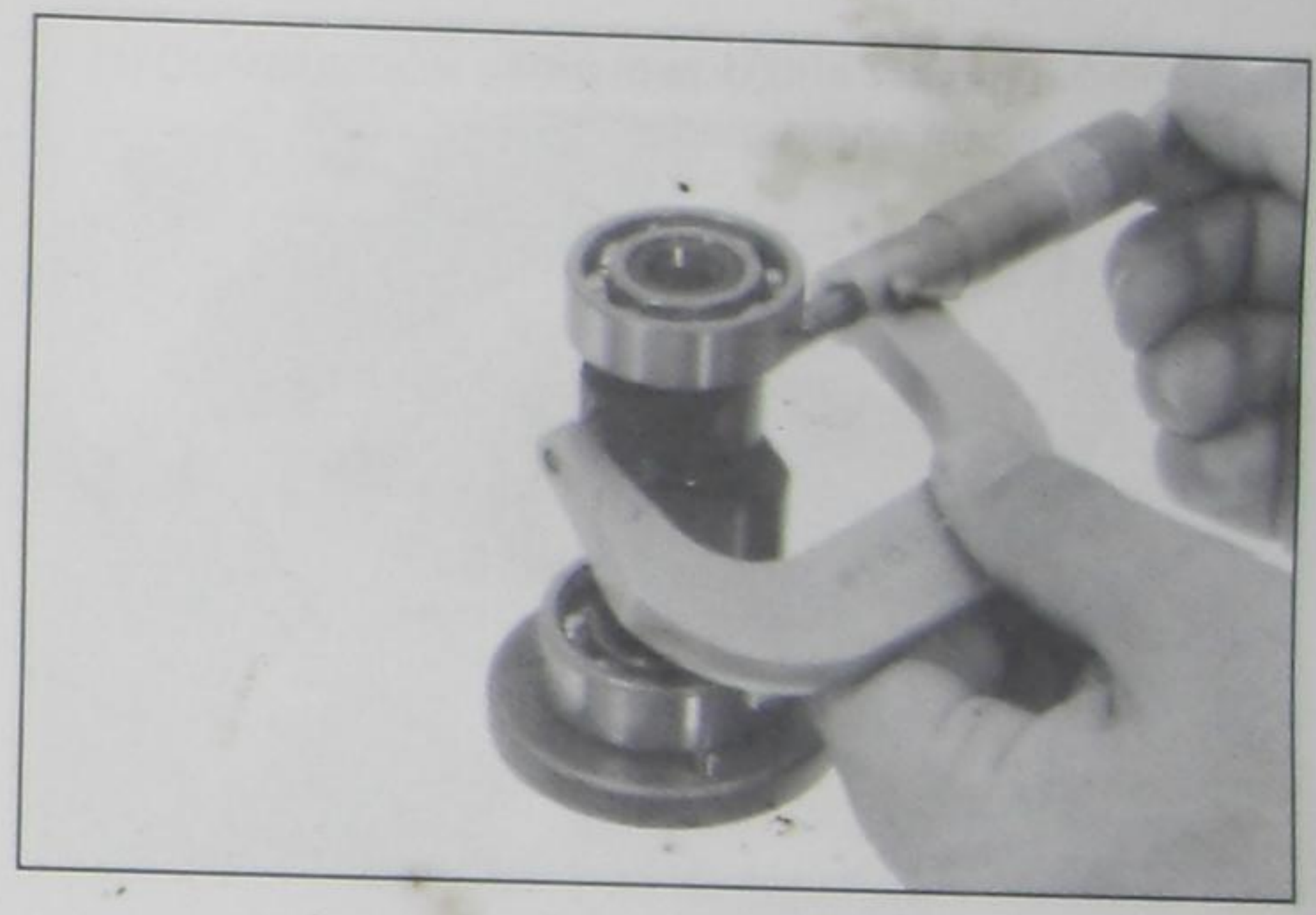
**CAMSHAFT**

Turn the outer race of each bearing with your finger.
The bearings should turn smoothly and quietly. Also check that the bearing inner race fits tightly on the camshaft.

Check the cam and journal surfaces on the camshaft for scoring, scratches or evidence of insufficient lubrication.
Check the oil holes in the camshaft for clogging.

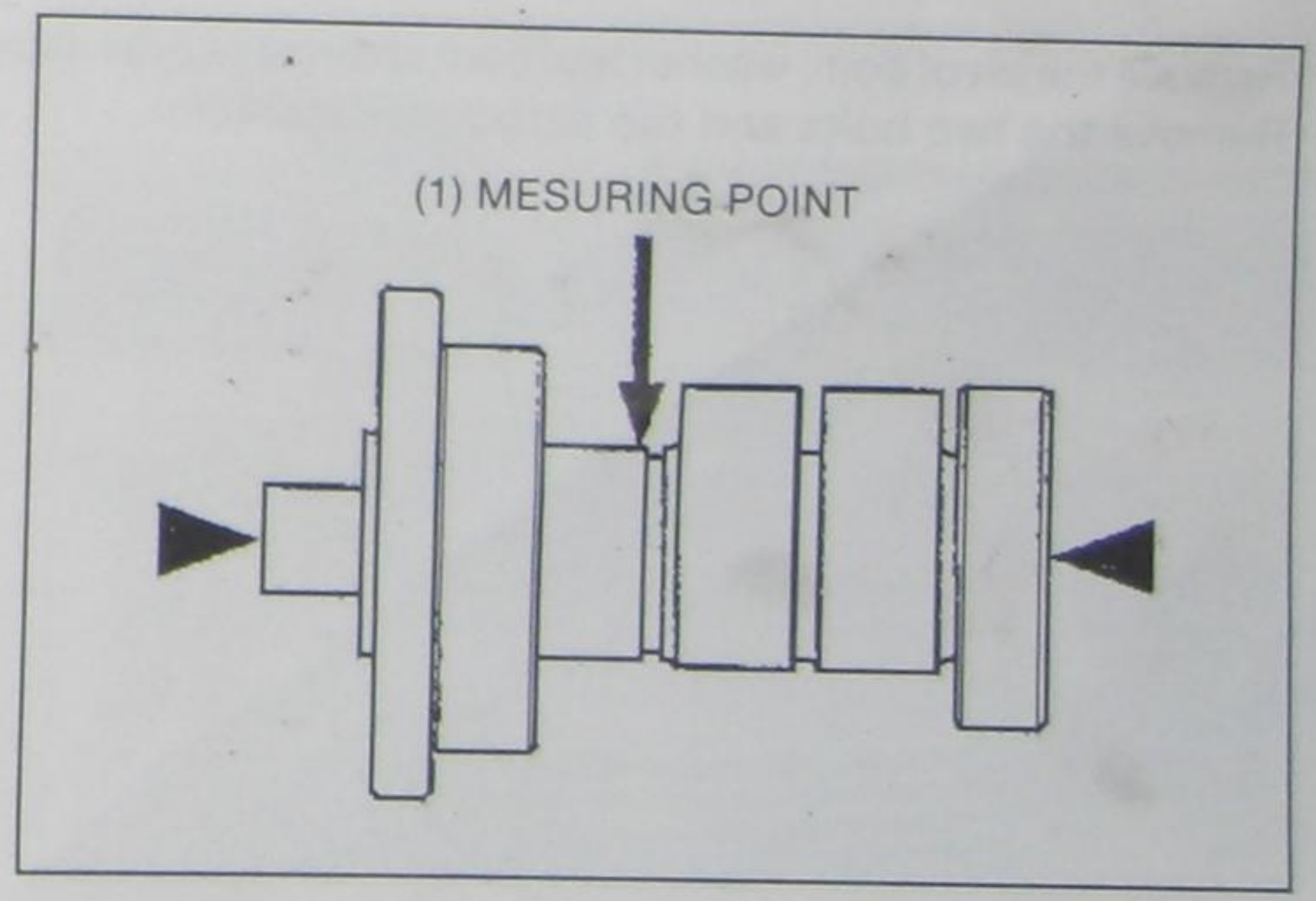
Measure each cam lobe height using a micrometer.

**SERVICE LIMITS: IN: 31.10 mm (1.224 in)**
**EX: 30.70 mm (1.209 in)**



Measure the camshaft runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

**SERVIVE LIMIT: 0.05 mm (0.002 in)**



**ROCKER ARM/SHAFT**

Check the rocker arms and shafts for excessive wear or damage.

Measure the I.D. of each rocker arm.

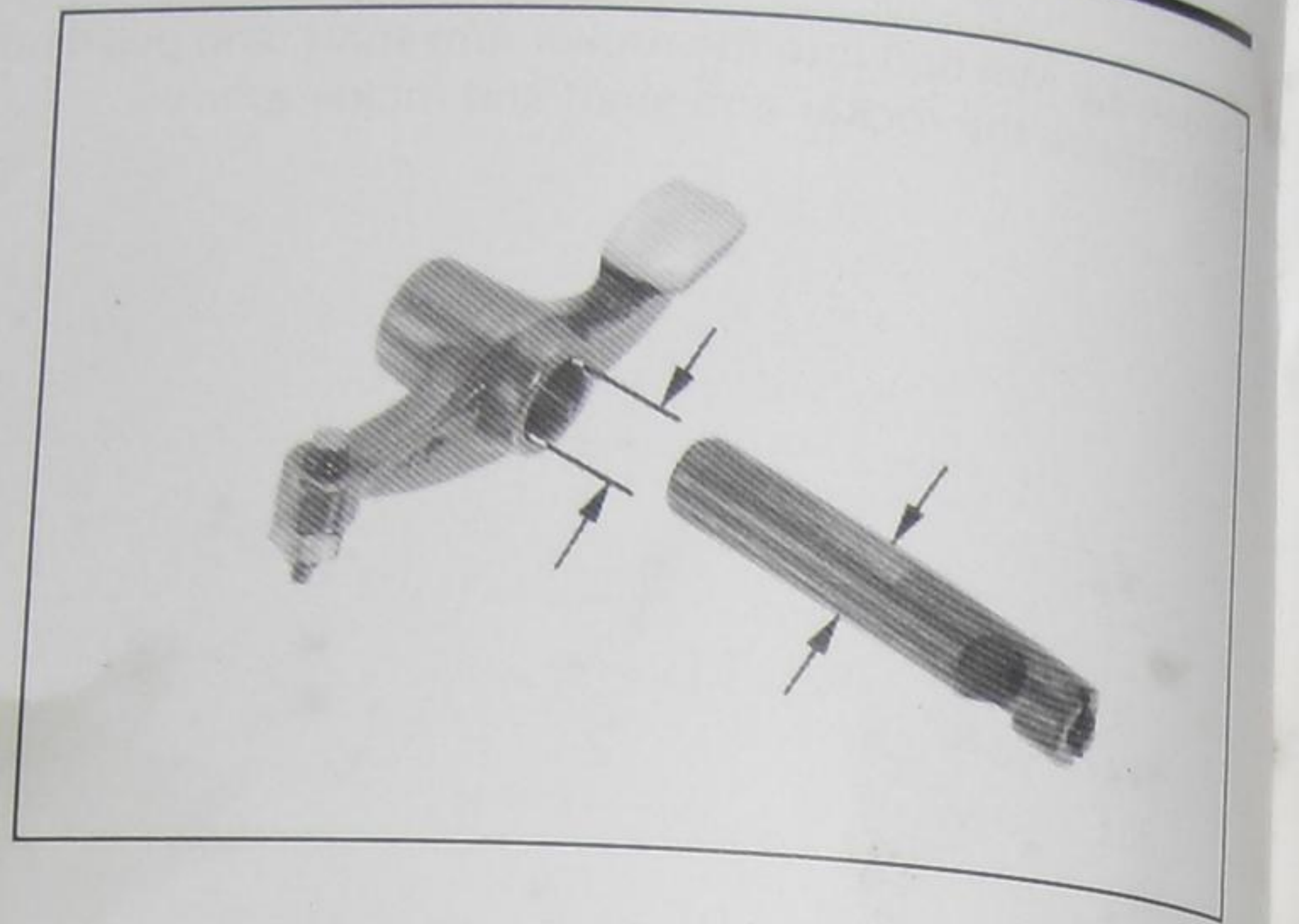
**SERVICE LIMIT: 12.05 mm (0.474 in)**

Measure the O.D. of each rocker arm shaft.

**SERVICE LIMIT: 11.93 mm (0.470 in)**

Subtract each rocker arm shaft O.D. from the corresponding rocker arm I.D. to obtain the rocker arm-to-shaft clearance.

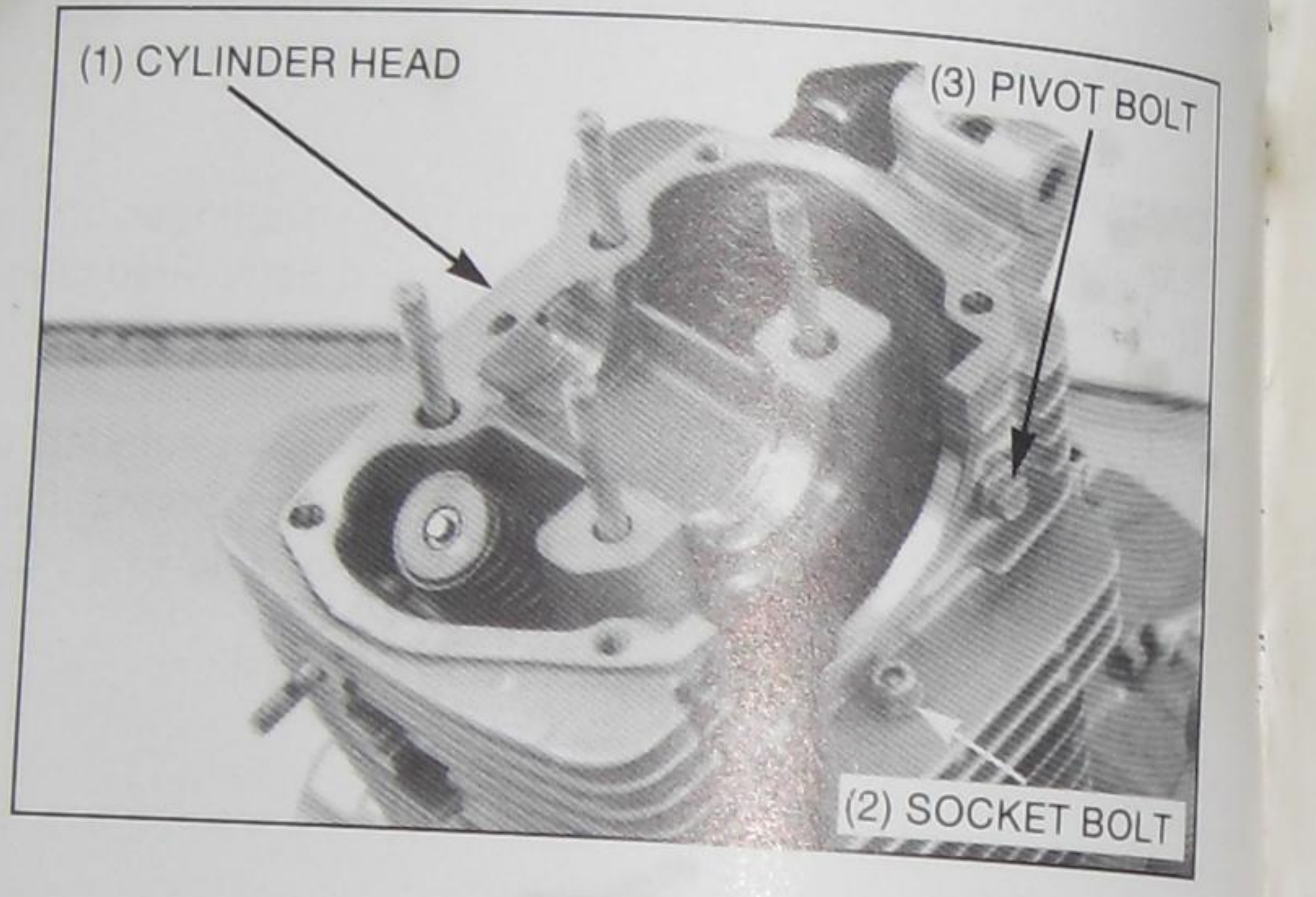
**SERVICE LIMIT: 0.08 mm (0.003 in)**



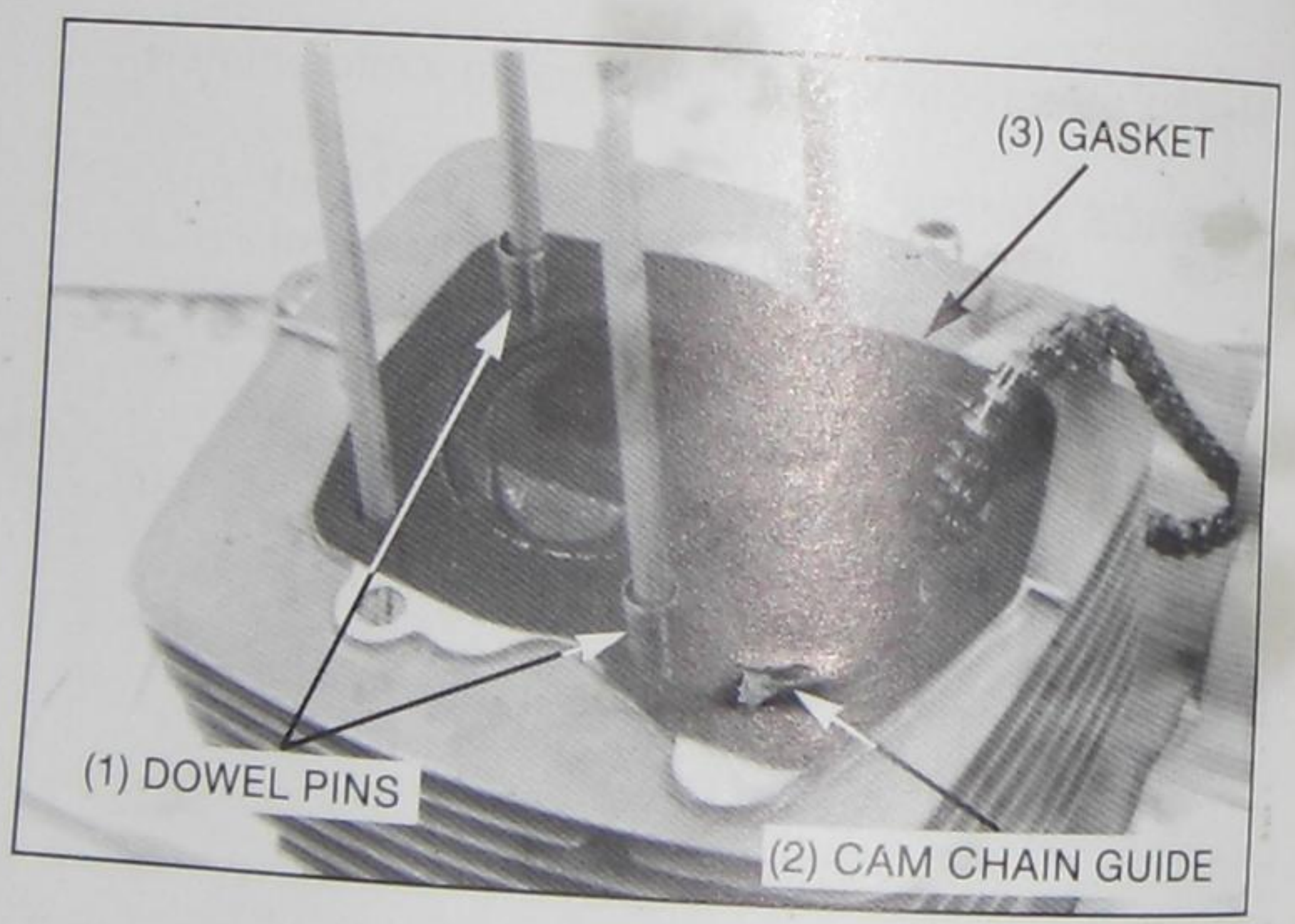
## Cylinder Head Removal

Remove the spark plug.
Loosen the cam chain tensioner slider pivot bolt.
Remove the cylinder head socket bolt.

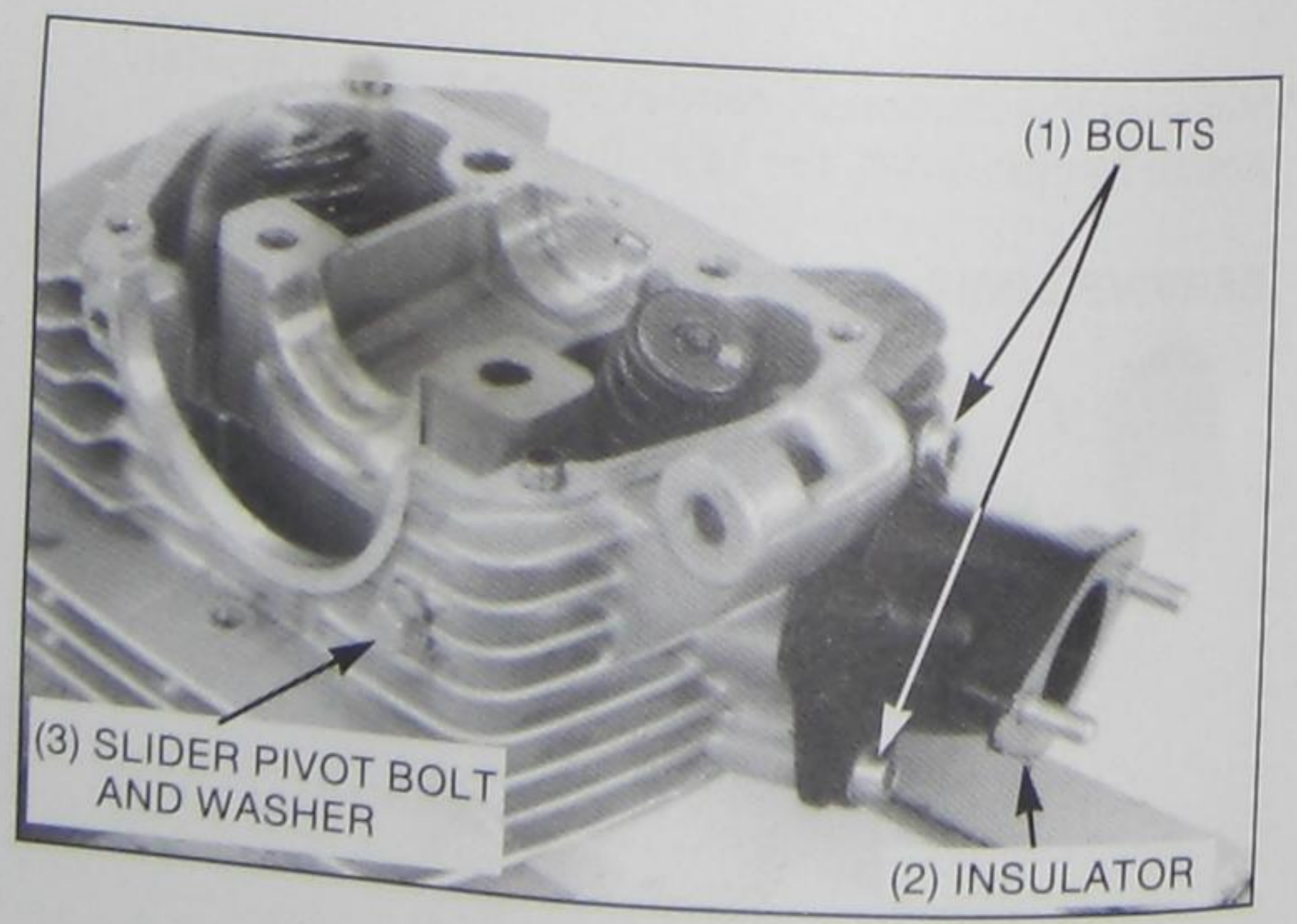
Remove the cylinder head.
Do not strike the cylinder head too hard and not damage the mating surfaces by using the screwdriver.


(1) CYLINDER HEAD
(3) PIVOT BOLT
(2) SOCKET BOLT

Remove the gasket and dowel pins.
Remove the cam chain guide.


(3) GASKET
(1) DOWEL PINS
(2) CAM CHAIN GUIDE

Remove the pivot bolt , washer and cam chain tensioner slider.
Remove the two bolts and the carburetor insulator.


(1) BOLTS
(3) SLIDER PIVOT BOLT AND WASHER
(2) INSULATOR

## Cylinder Head Disassembly

NOTE:

- Mark all parts during disassembly so they can be placed back in their original locations.

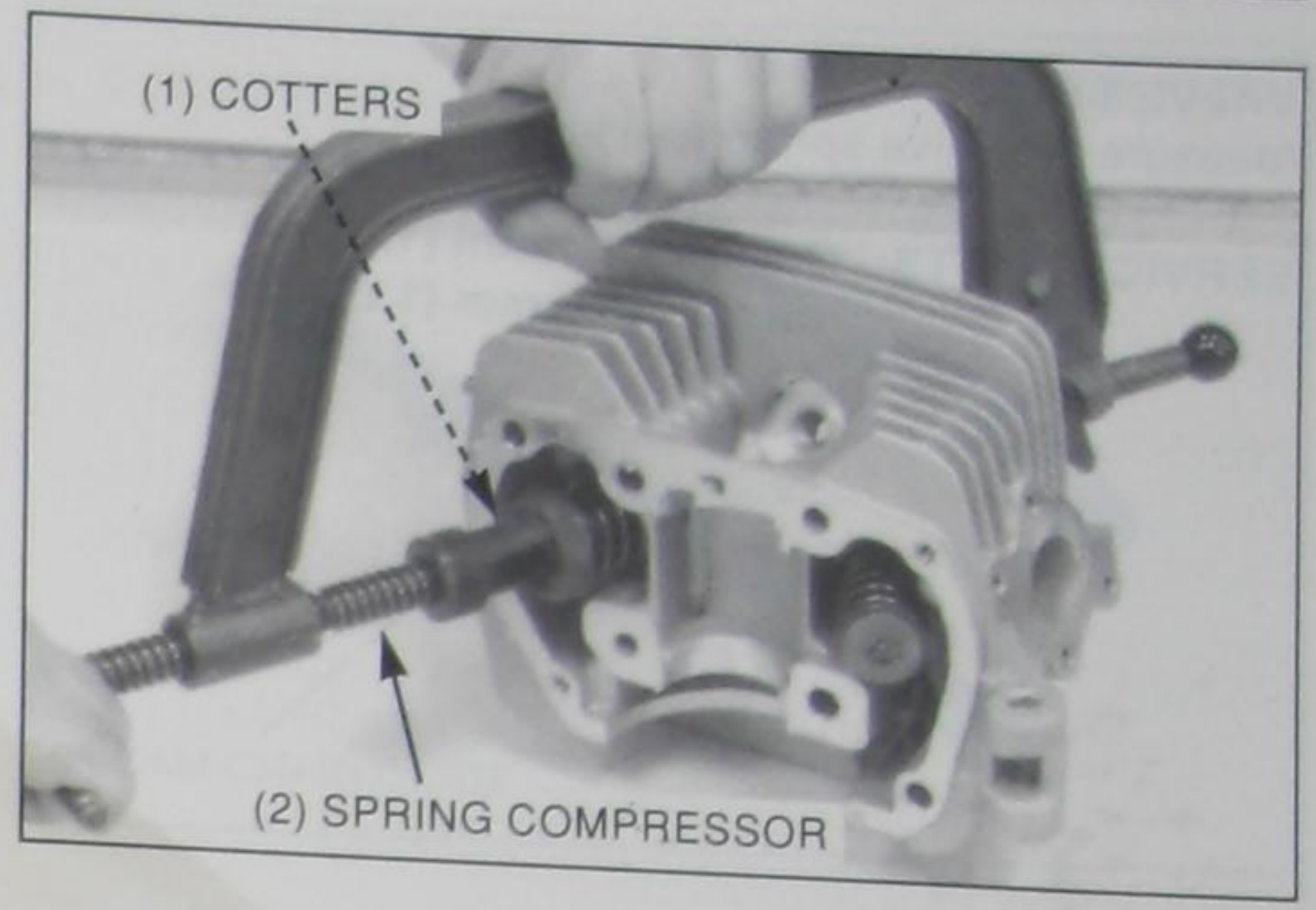
**CAUTION**

- **To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.**

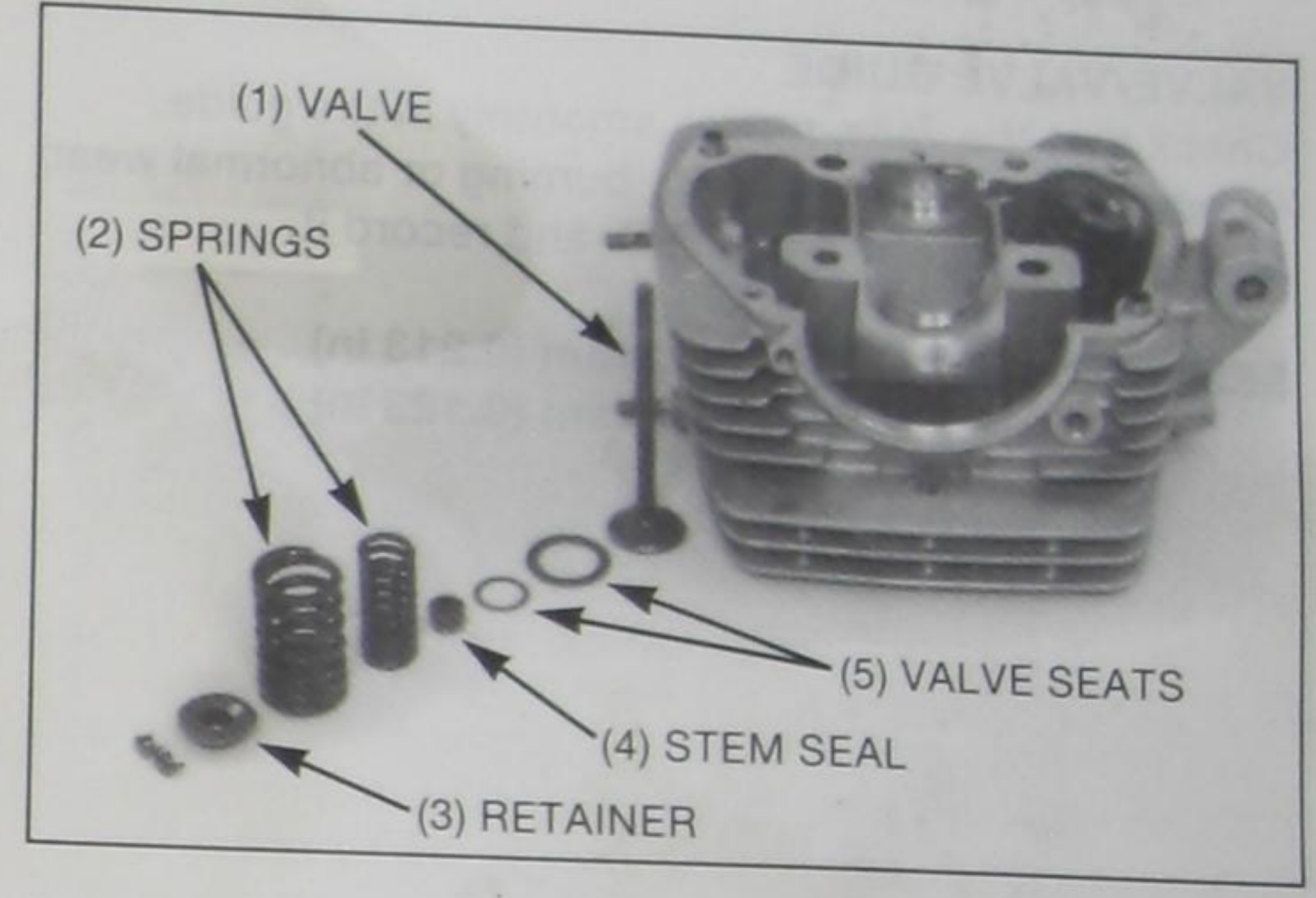
Remove the valve spring cotters using the valve spring compressor.

**TOOL:**

| | |
|---|---|
| **Valve spring compressor** | **07757-0010000** |


(1) COTTERS
(2) SPRING COMPRESSOR

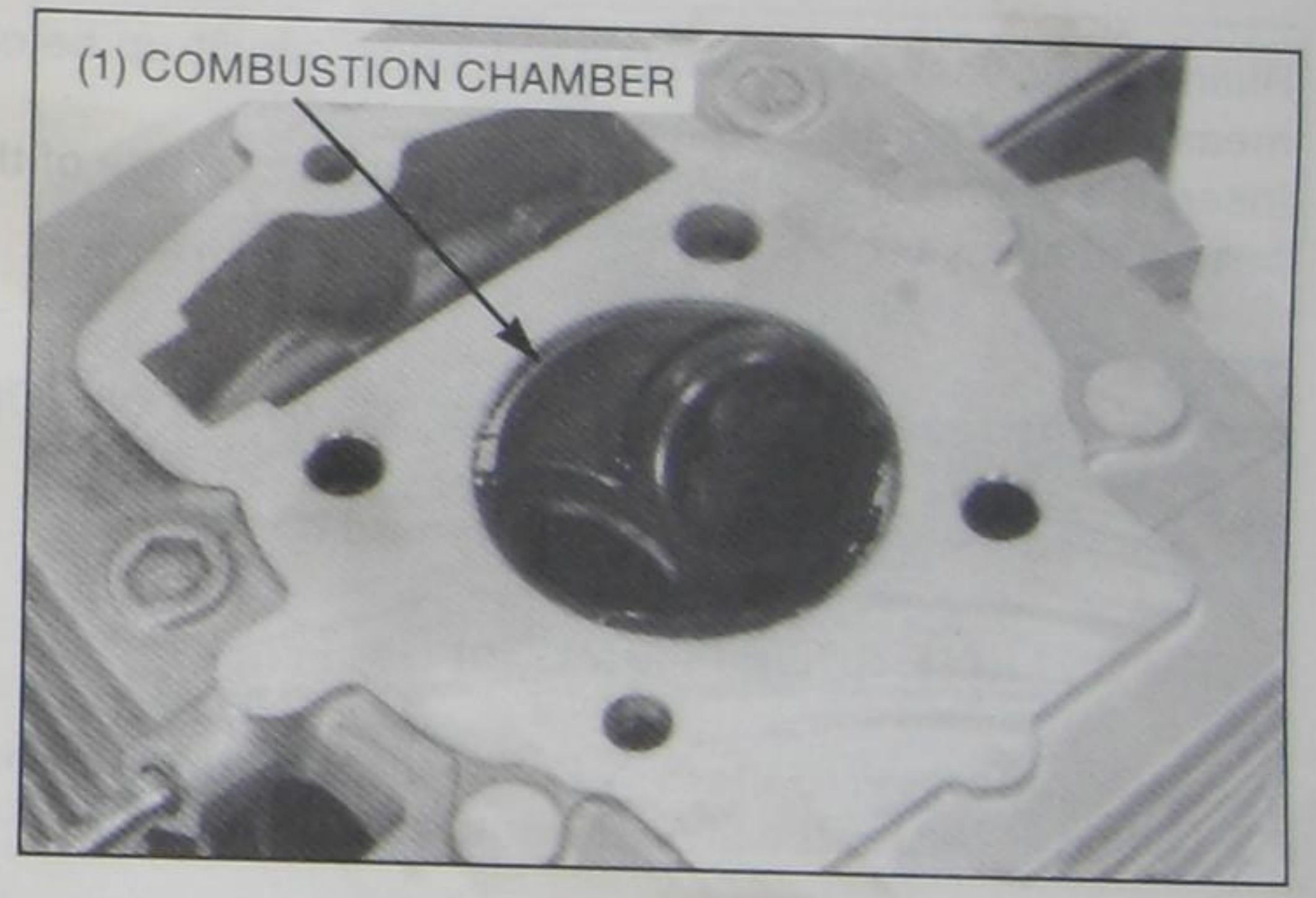
Remove the following:
- Spring retainer
- Inner and outer valve springs
- Valve
- Stem seal
- Inner and outer spring seats.


(1) VALVE
(2) SPRINGS
(5) VALVE SEATS
(4) STEM SEAL
(3) RETAINER

### INSPECTION

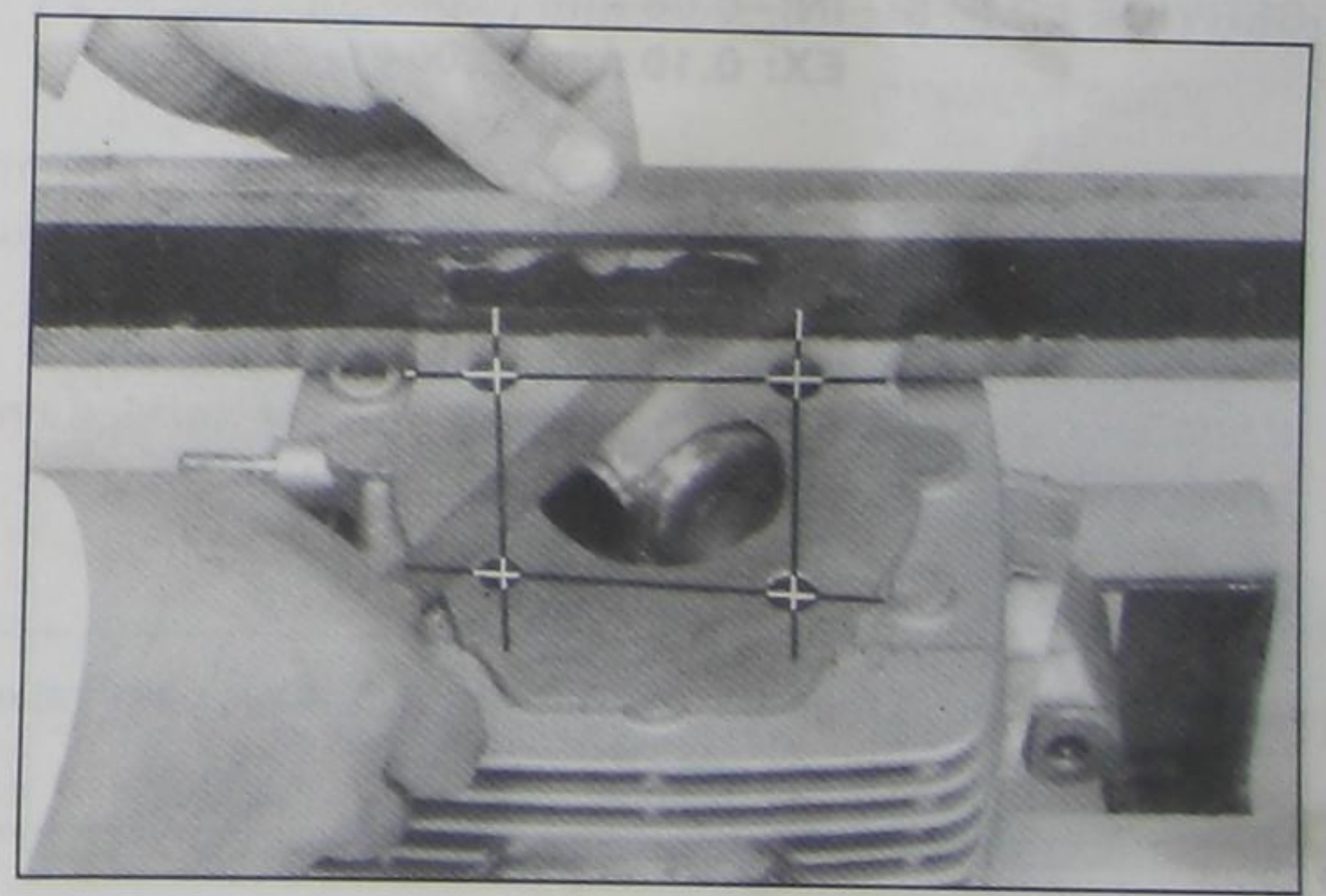
**CYLINDER HEAD**

Remove the carbon deposits from the combustion chamber, being careful not to damage the gasket surface.
Check the spark plug hole and valve areas for cracks.


(1) COMBUSTION CHAMBER

Check the cylinder head for warpage with a straight edge and feeler gauge.

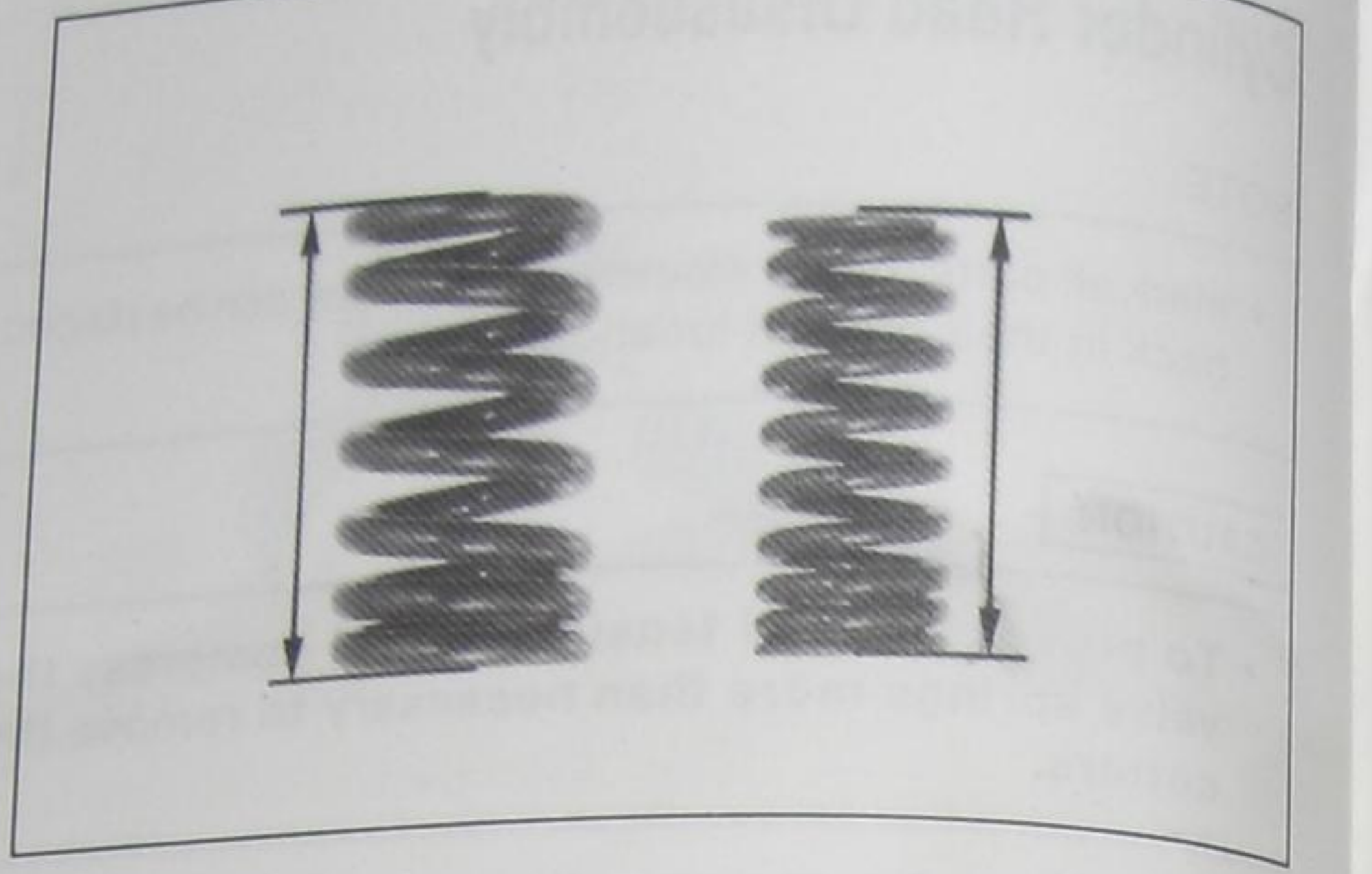
**SERVICE LIMIT: 0.10 mm (0.004 in)**



**VALVE SPRING**

Measure the valve spring free length.

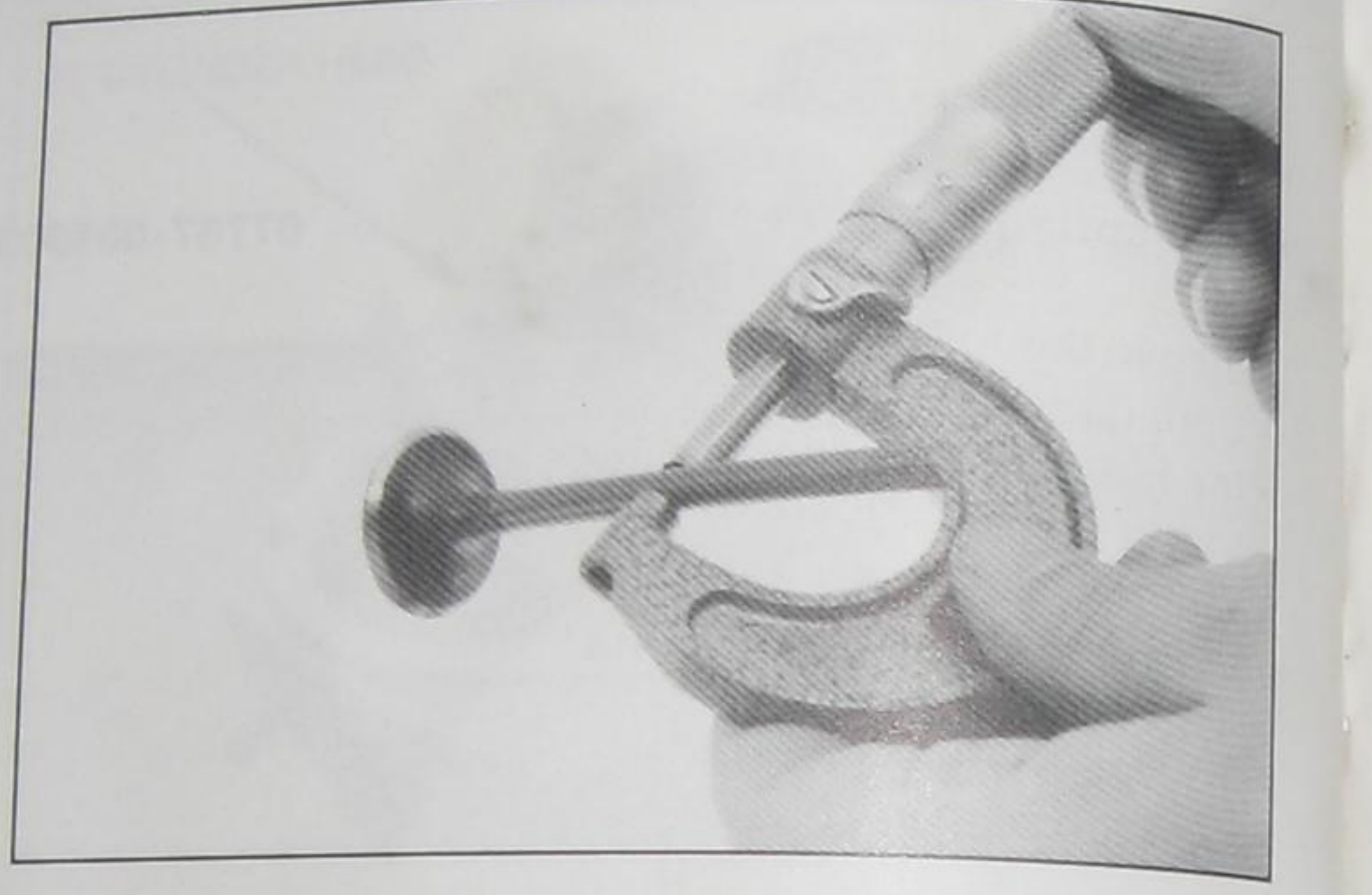
**SERVICE LIMITS: Outer: 43.5 mm (1.71 in)**
**Inner: 38.0 mm (1.50 in)**



**VALVE/VALVE GUIDE**

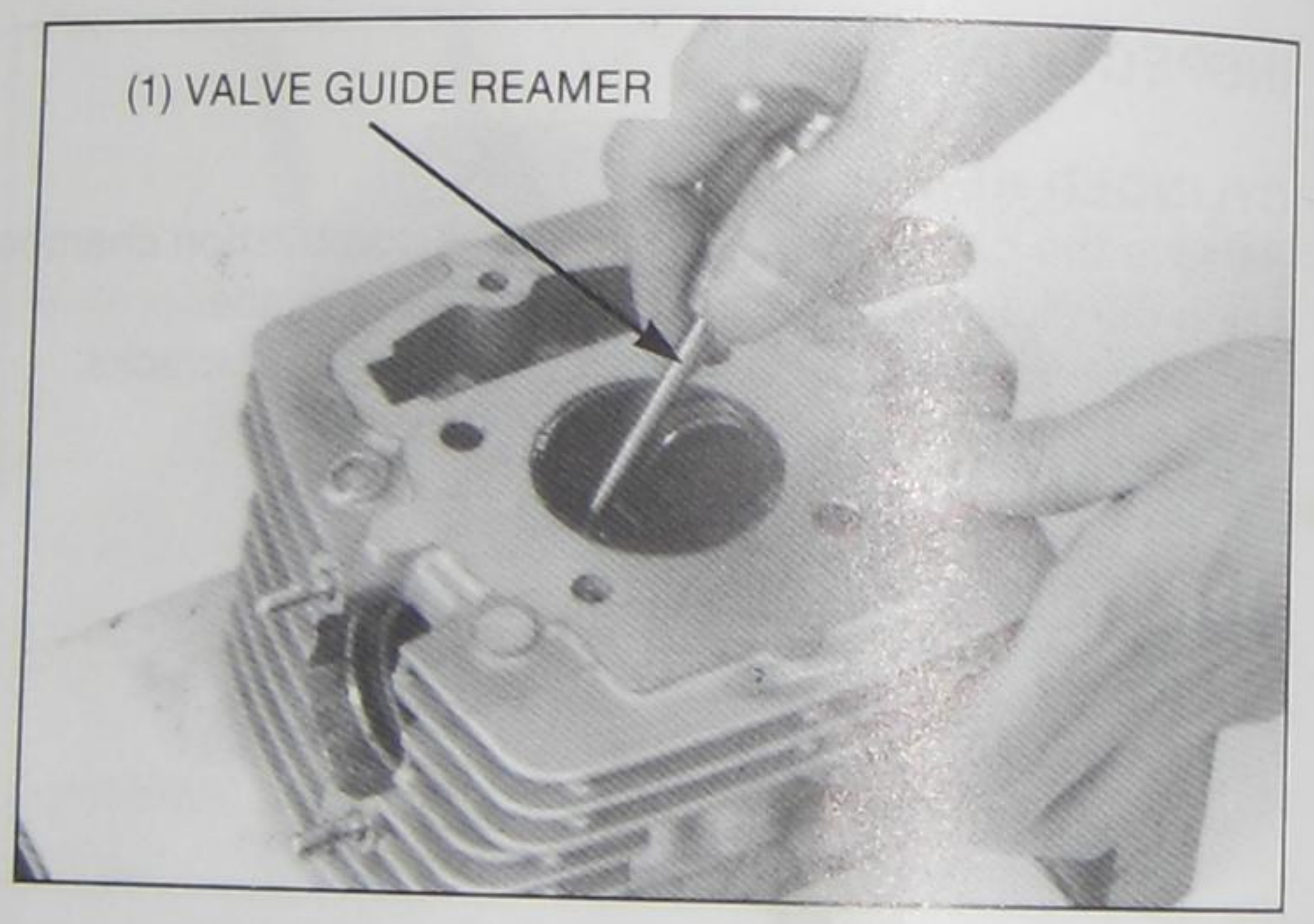
Check that the valve moves smoothly in the guide.
Check the valve for bending, burning or abnormal wear.
Measure each valve stem O.D. and record it.

**SERVICE LIMITS: IN: 5.42 mm (0.213 in)**
**EX: 5.40 mm (0.123 in)**



Ream the valve guide to remove any carbon built-up before measuring the guide.
Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

**TOOL:**
**Valve guide reamer** **07984-0980001**



Measure each valve guide I.D. and record it.

**SERVICE LIMIT: 5.50 mm (0.217 in)**

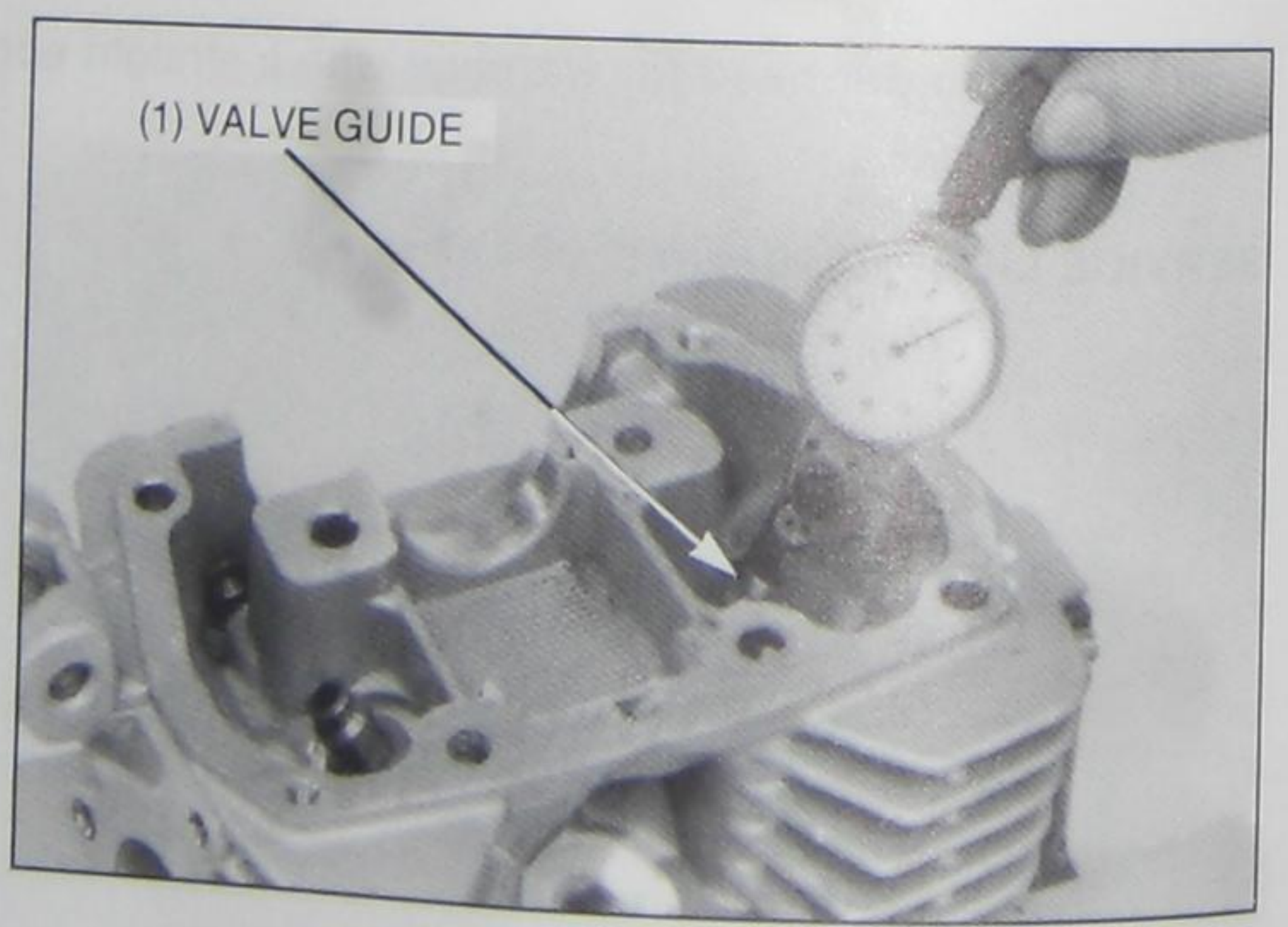
Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

**SERVICE LIMITS: IN: 0.08 mm (0.003 in)**
**EX: 0.10 mm (0.004 in)**

If the stem-to guide clearance exceeds the service limit, determine if a new guide with standard dimensions would bring the clearance within tolerance.
If so, replace any guides as necessary and ream to fit.
If the stem-to-guide clearance exceeds the service limit with a new guide, also replace the valve.

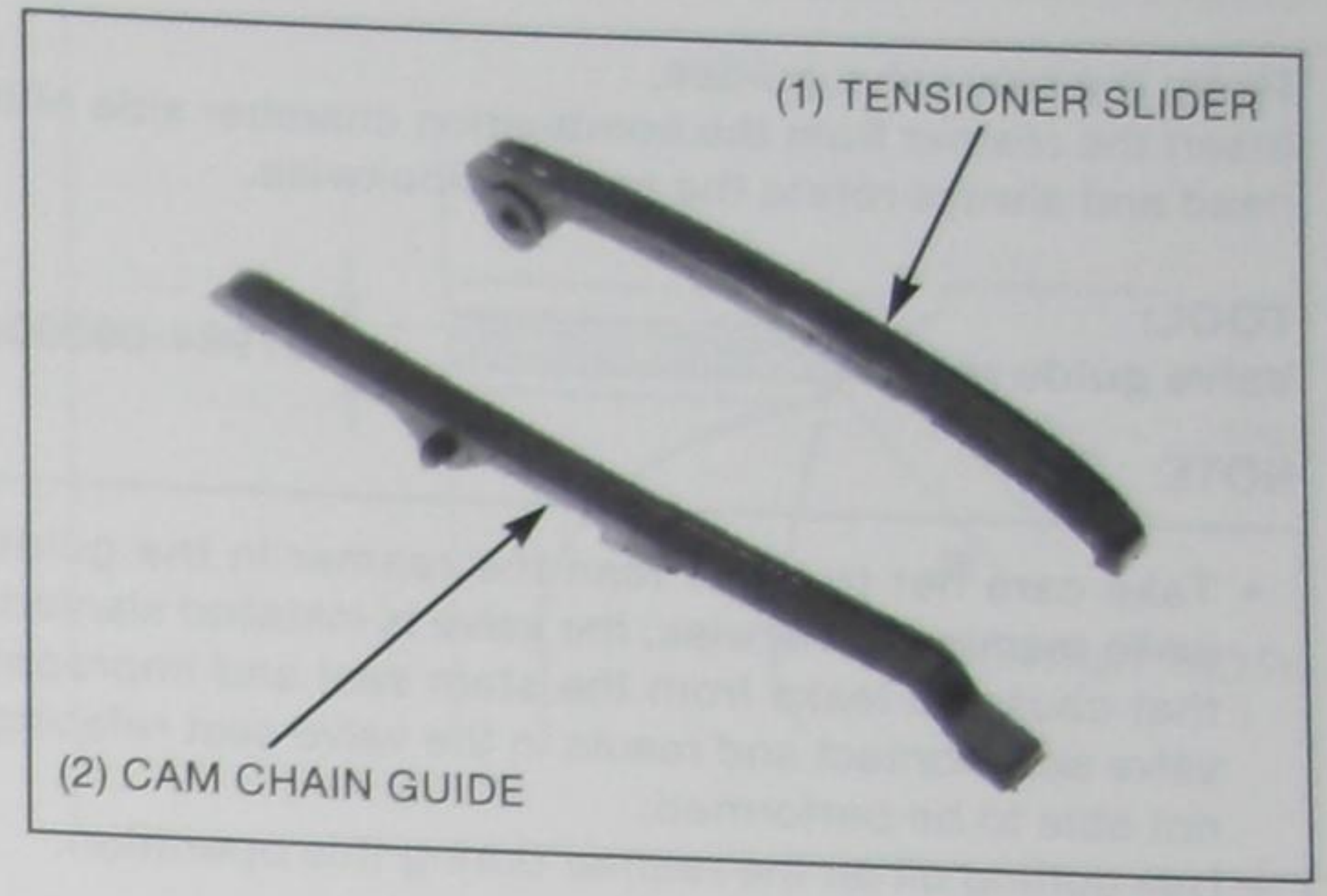
NOTE:

- Inspect and reface the valve seats whenever the valve guides are replaced (page 7-10).



**CAM CHAIN GUIDE/TENSIONER SLIDER**

Check the cam chain guide and tensioner slider for excessive wear or damage and replace them if necessary.



## Valve Guide Replacement

Chill new valve guides in the freezer section of a refrigerator for about an hour.
Heat the cylinder head to 130-140°C (275-290°F) with a hot plate or oven.

**⚠ WARNING**

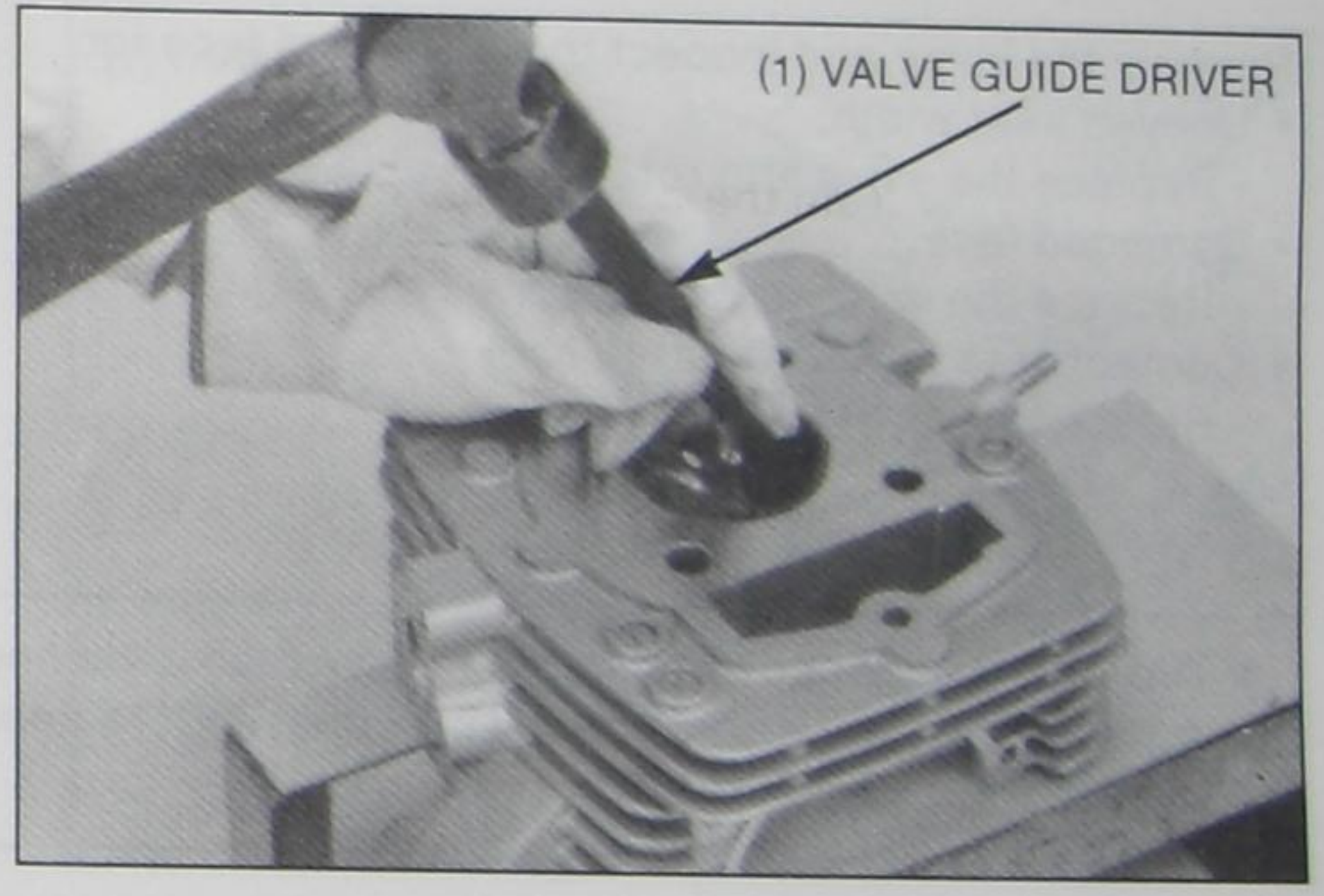
- **Wear heavy gloves to avoid burns when handling the heated cylinder head.**

CAUTION

- **Using a torch to heat the cylinder head may cause warpage.**

Support the cylinder head and drive the valve guides out of the cylinder head from the combustion chamber side.

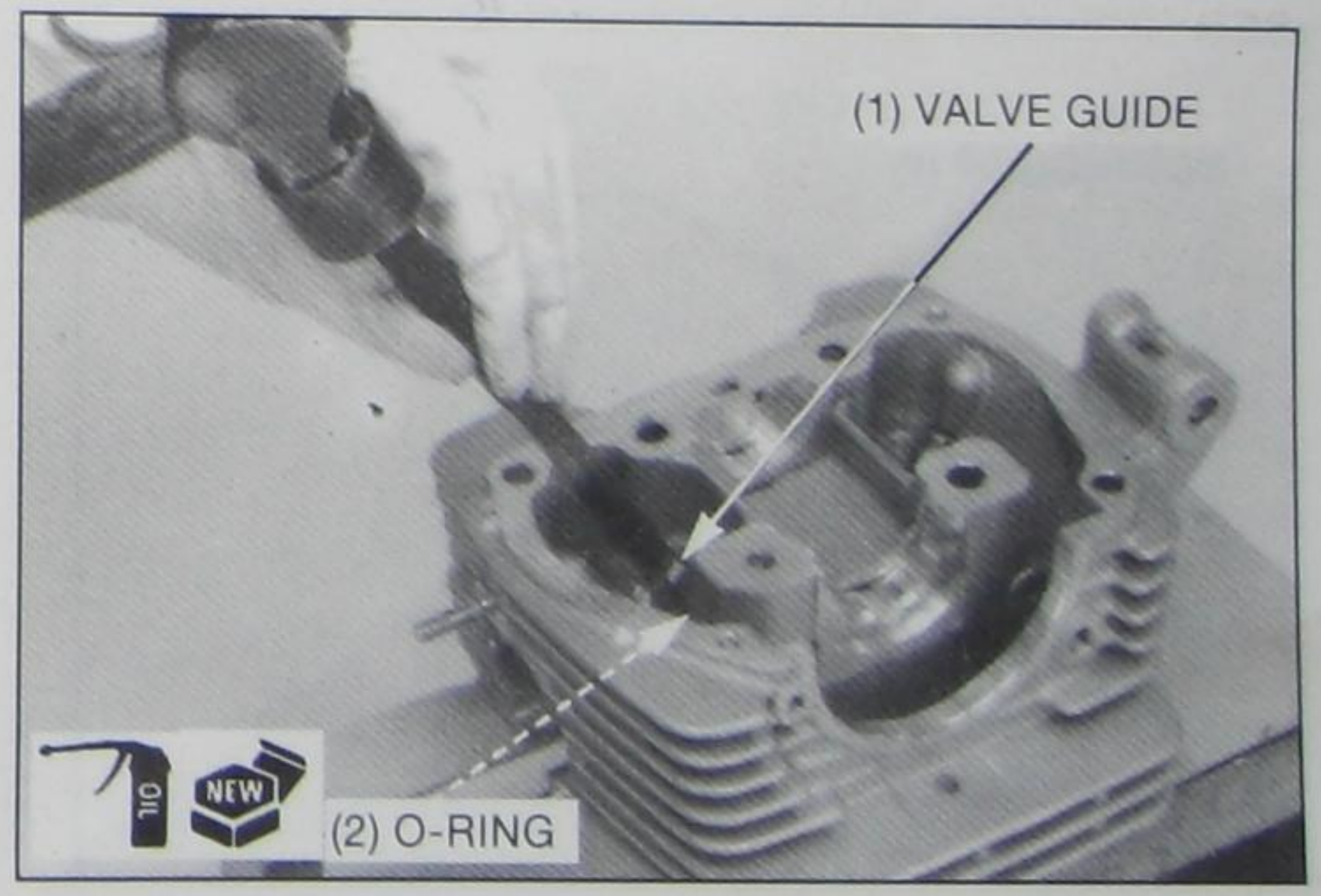
**TOOL:**
**Valve guide driver, 5.5 mm** **07742-0010100**



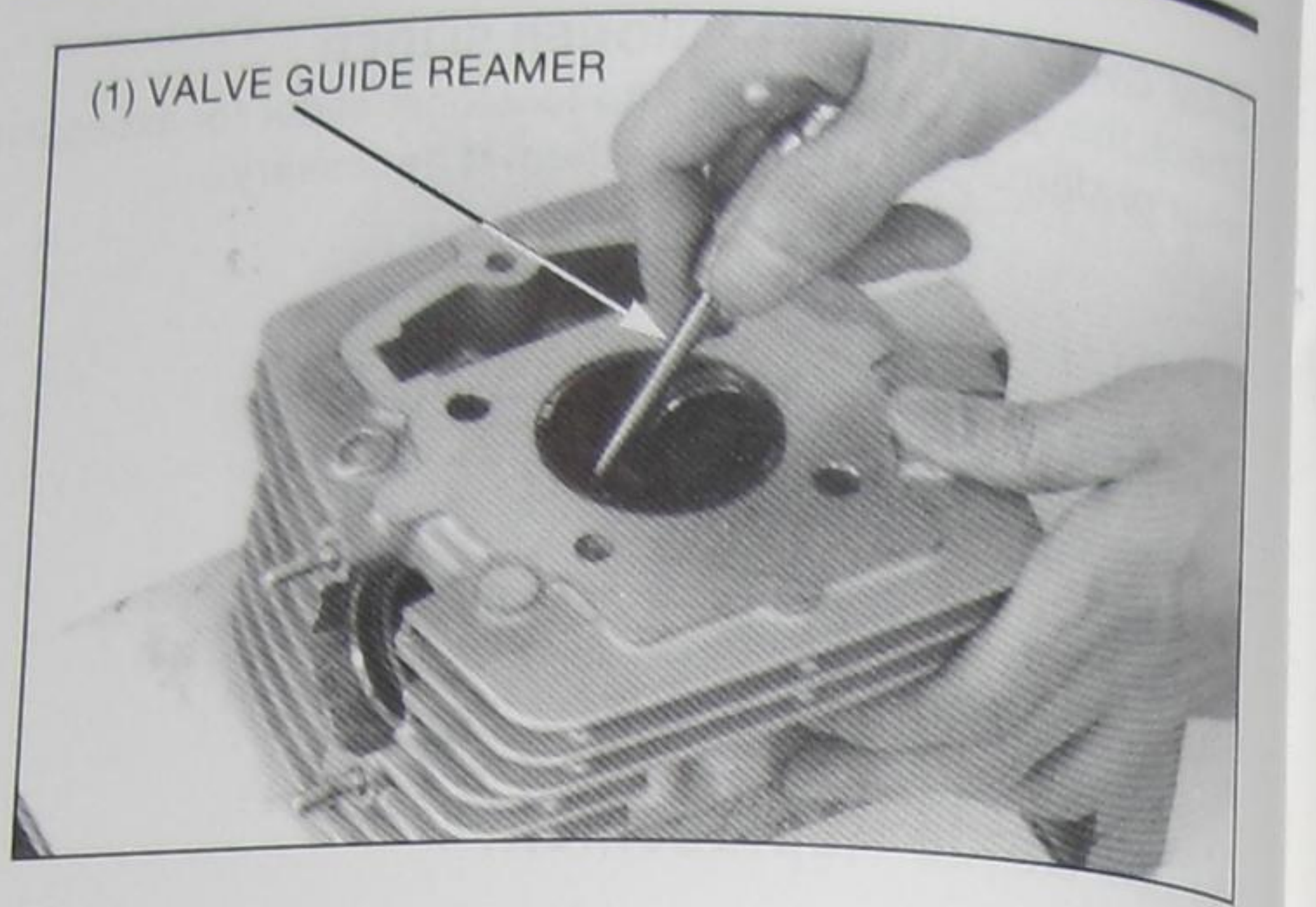
Coat new O-rings with oil and install them onto new valve guides.
Drive new valve guides in the cylinder head from the camshaft side until there are fully seated while the cylinder head is still heated.

**TOOL:**
**Valve guide driver, 5.5 mm** **07742-0010100**

Let the cylinder head cool to room temperature.



Ream the new valve guides.
Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

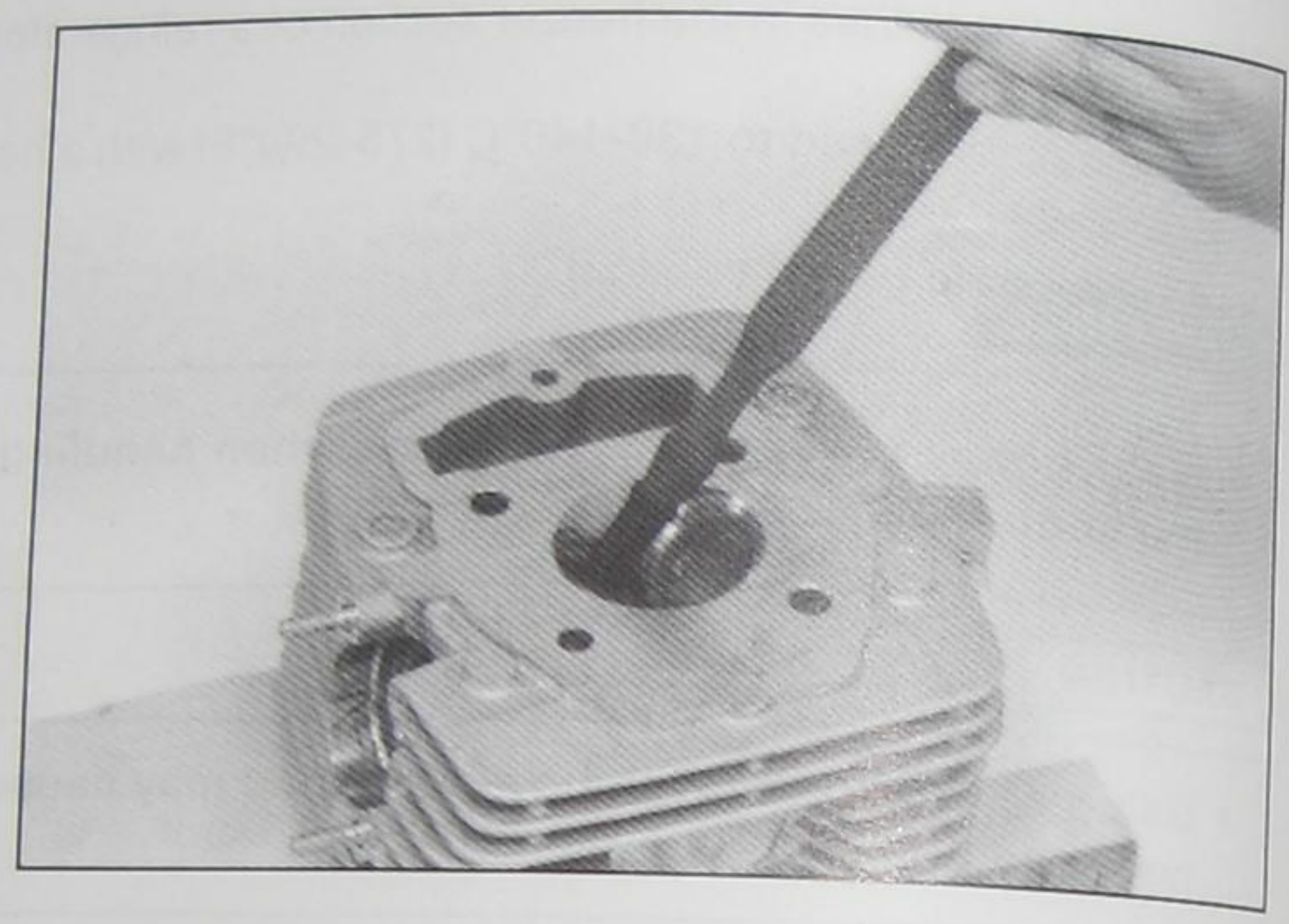


**TOOL:**
**Valve guide reamer** **07984-0980001**

NOTE:

- Take care not to tilt or lean the reamer in the guide while reaming. Otherwise, the valve is installed slanted, that cause oil leaks from the stem seal and improper valve seat contact and resuts in the valve seat refacing not able to be performed.
- Use cutting oil on the reamer during this operation.

Clean the cylinder head thoroughly to remove any metal particles after reaming and reface the valve seat.



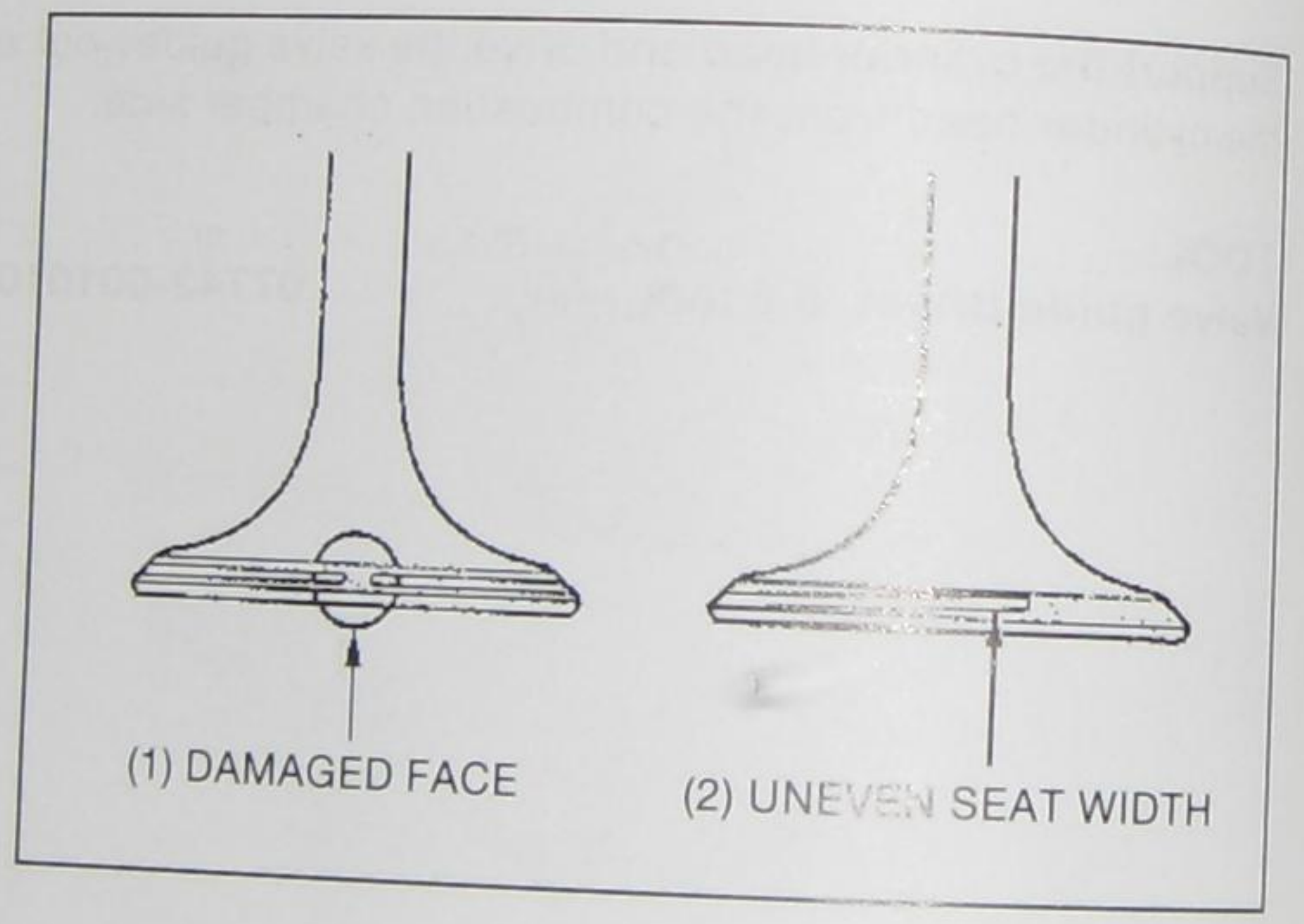
## Valve Seat Inspection/Refacing

### INSPECTION

Clean all intake and exhaust valves thoroughly to remove carbon deposits.

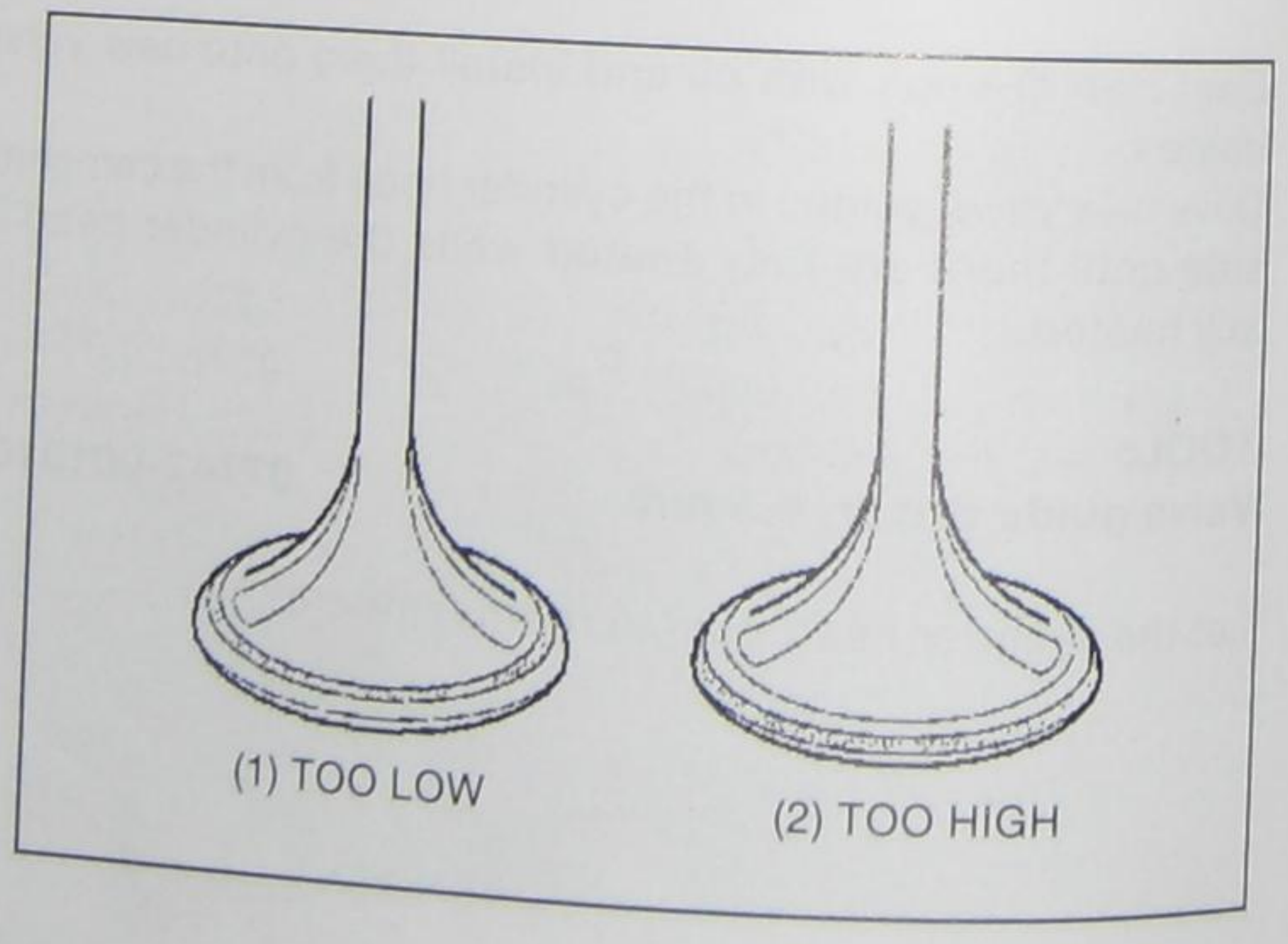
Apply a light coating of Prussian blue to each valve seat. Tap the valve against the valve seat several times without rotating the valve, to check for proper valve seat contact.

Remove the valve and inspect the valve seat face for:
- Uneven seat width:
  - Replace the valve and reface the valve seat.
- Damaged face:
  - Replace the valve and reface the valve seat
- Contact area (too high or too low)
  - Reface the valve seat



NOTE:

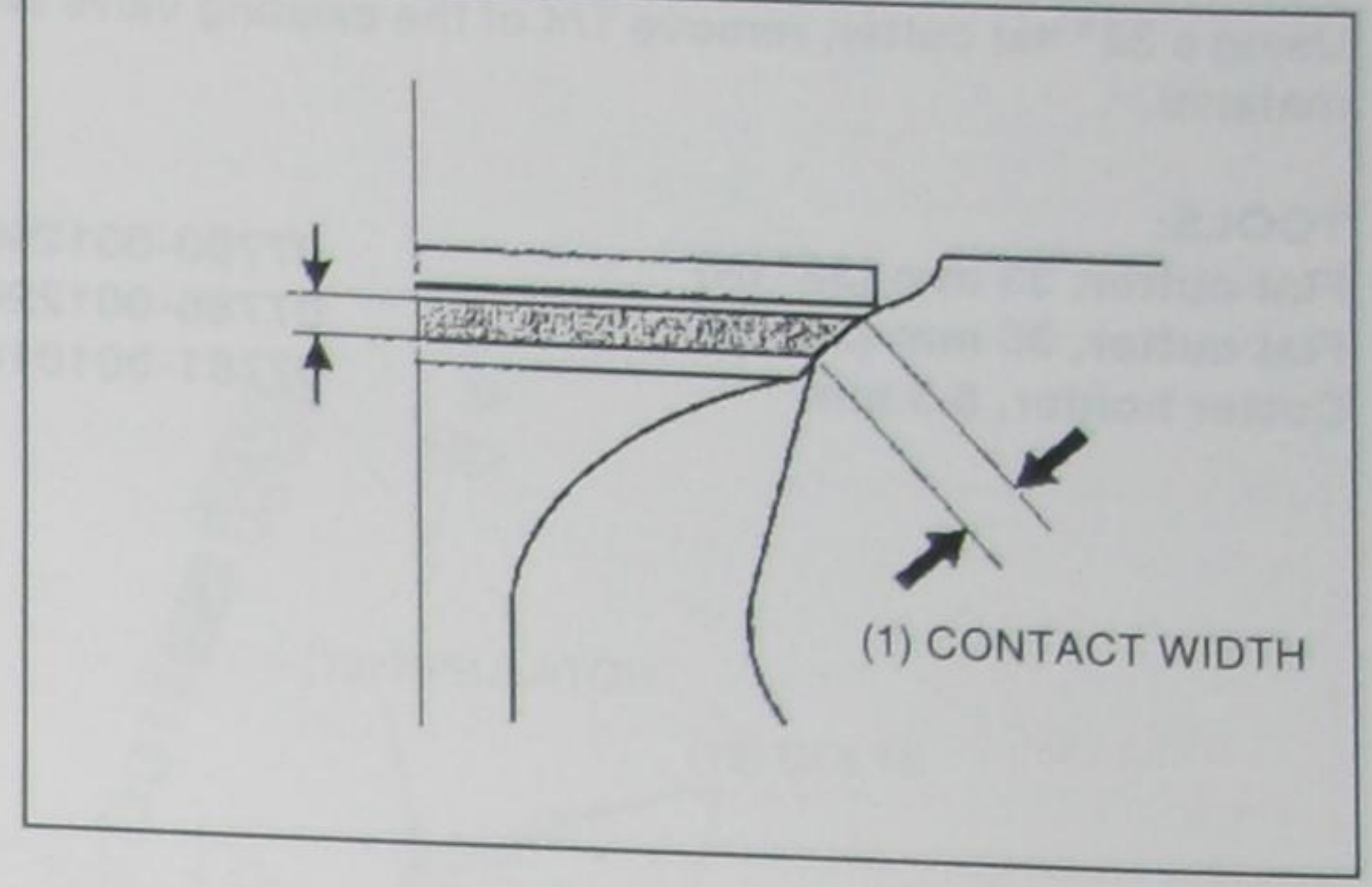
- The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.



Inspect the width of valve seat.
The valve seat contact should be within the specified width and even all around the circumference.

**STANDARDS: IN/EX: 1.1-1.3 mm (0.04-0.05 in)**
**SERVICE LIMITS: IN/EX: 1.5 mm (0.06 in)**

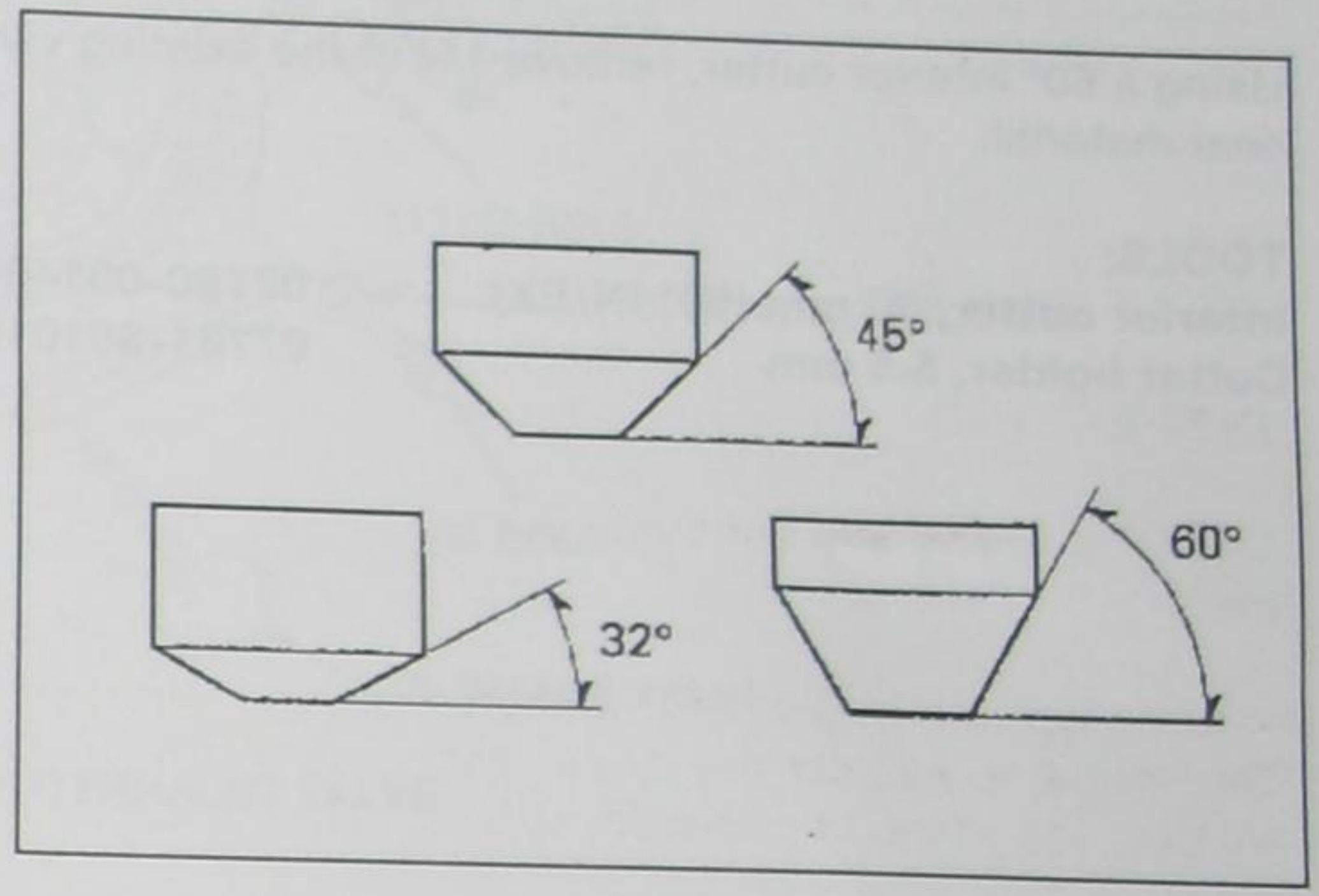
If the valve seat width i not within specification, reface the valve seat (see below).



### REFACING

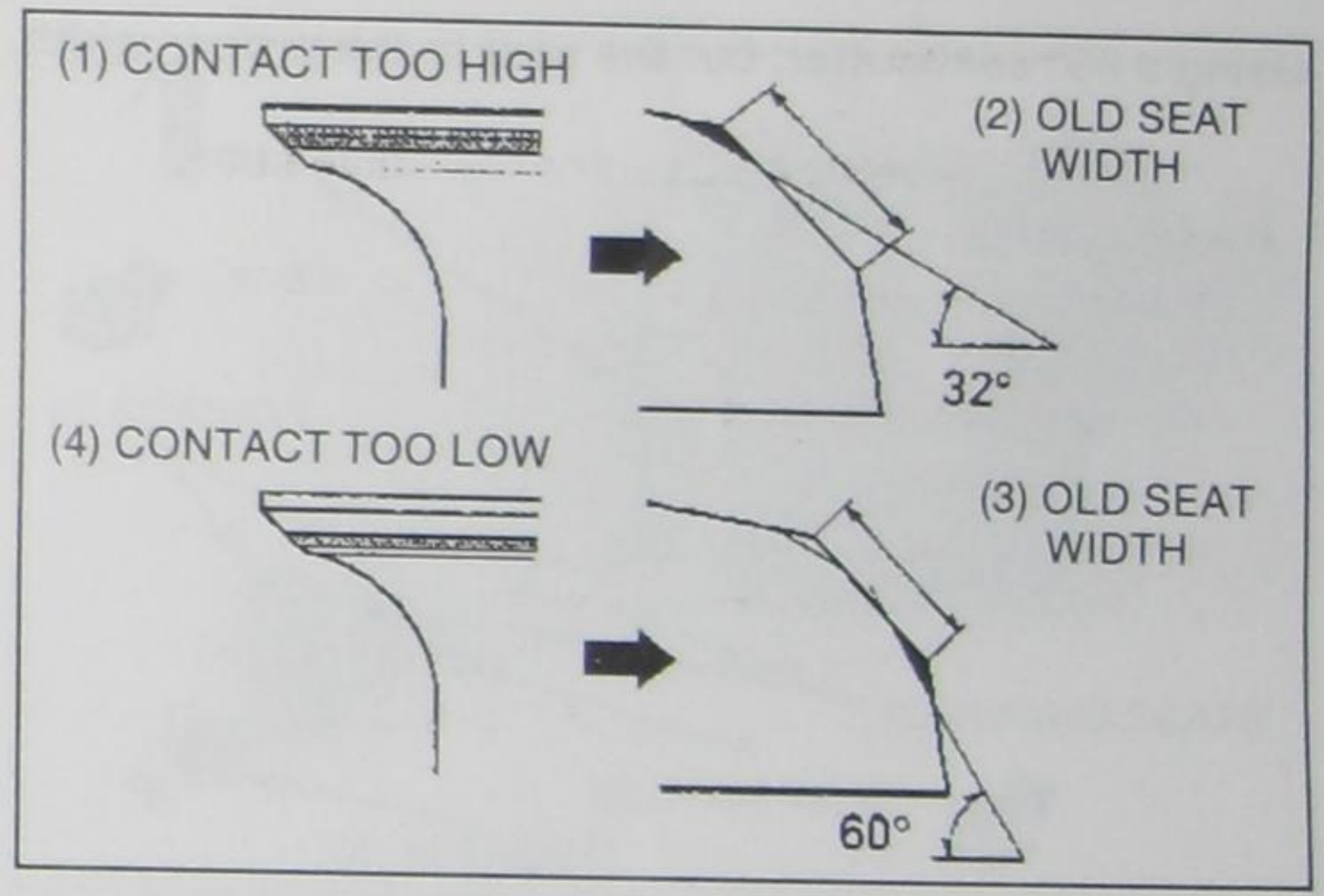
NOTE:

- Follow the refacing manufacturer's operating instructions.
- Be careful not to grind the seat more than necessary.



If the contact area is too high on the valve, the seat must be lowered using a 32° flat cutter.

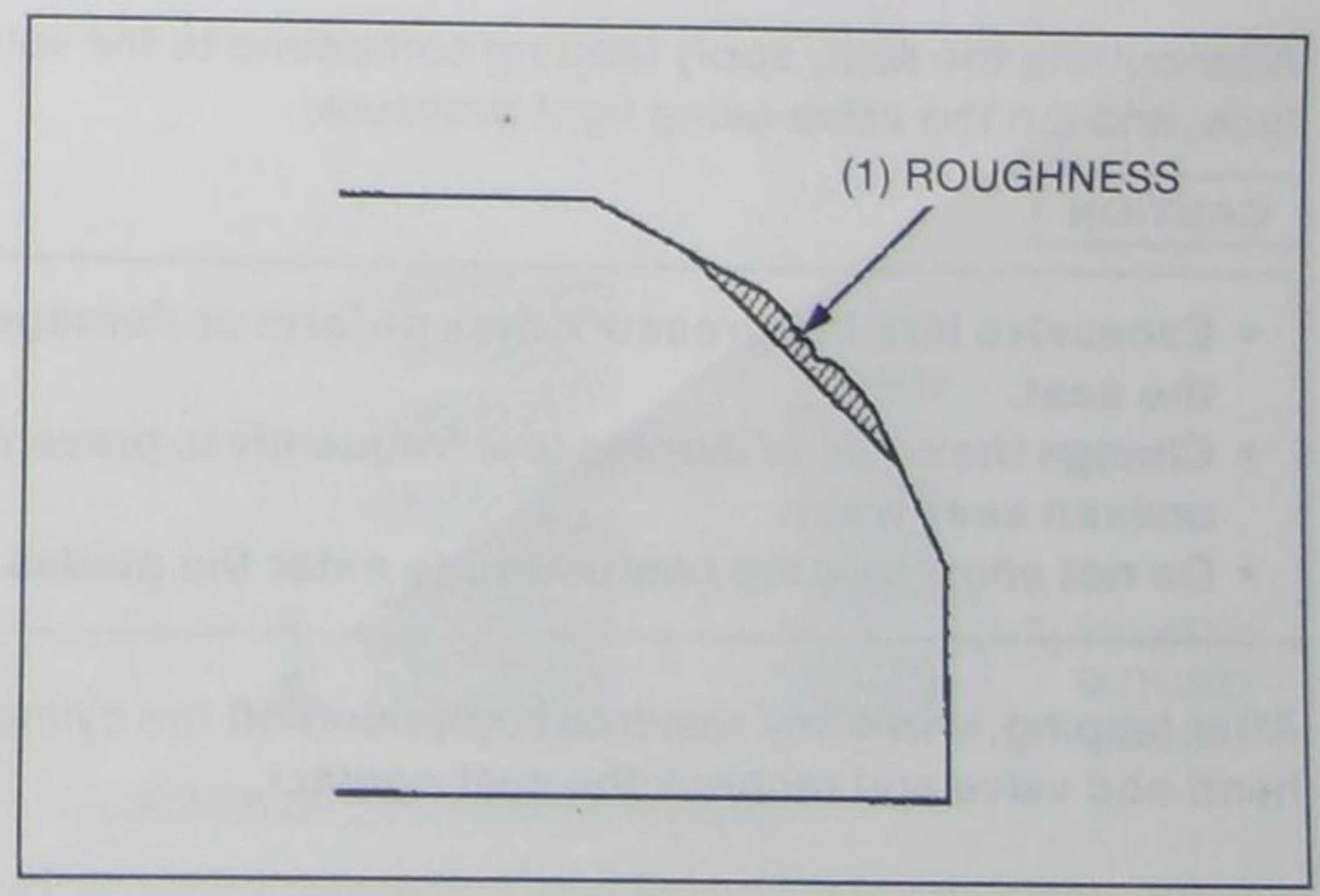
If the contact area is too low on the valve, the seat must be raised using a 60° interior cutter.



Using a 45° seat cutter, remove any roughness or irregularities from the seat.

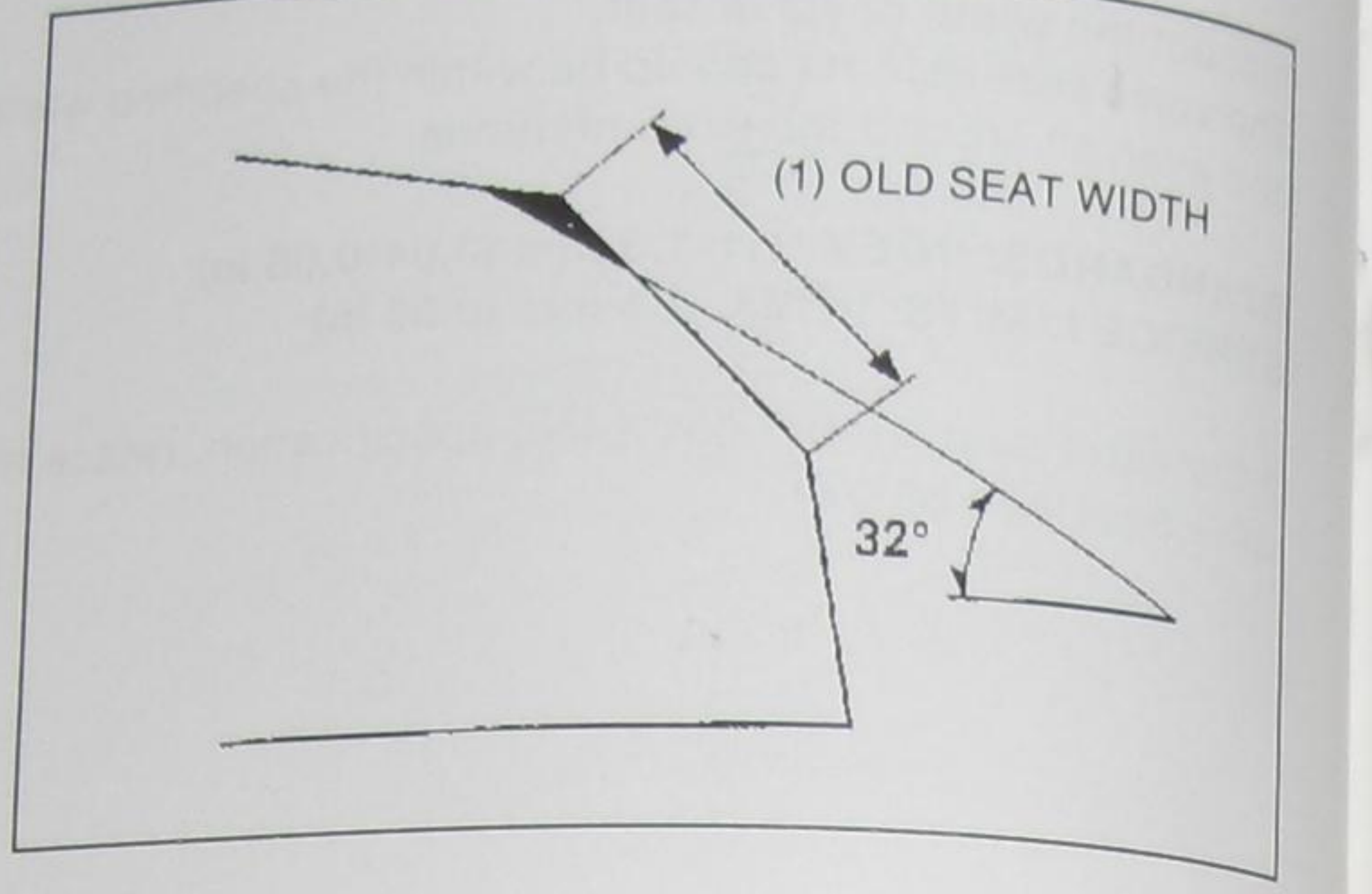
**TOOLS:**

| | |
|---|---|
| **Seat cutter, 33 mm (45° IN)** | **07780-0010800** |
| **Seat cutter, 27.5 mm (45° EX)** | **07780-0010200** |
| **Cutter holder, 5.5 mm** | **07781-0010101** |



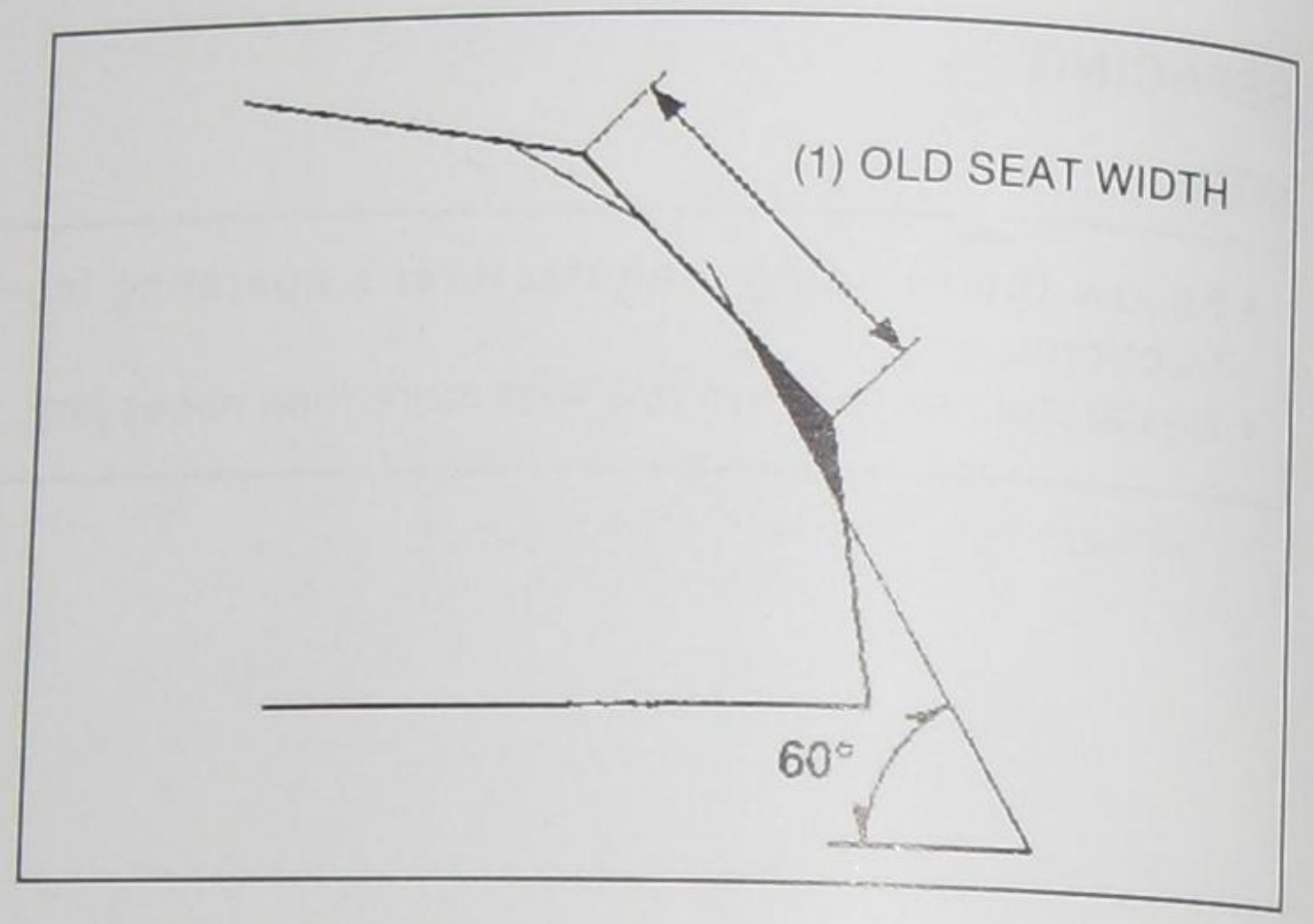
Using a 32° flat cutter, remove 1/4 of the existing valve seat material.

| **TOOLS:** | |
|---|---|
| **Flat cutter, 33 mm (32° IN)** | **07780-0012900** |
| **Flat cutter, 30 mm (32° EX)** | **07780-0012200** |
| **Cutter holder, 5.5 mm** | **07781-0010101** |

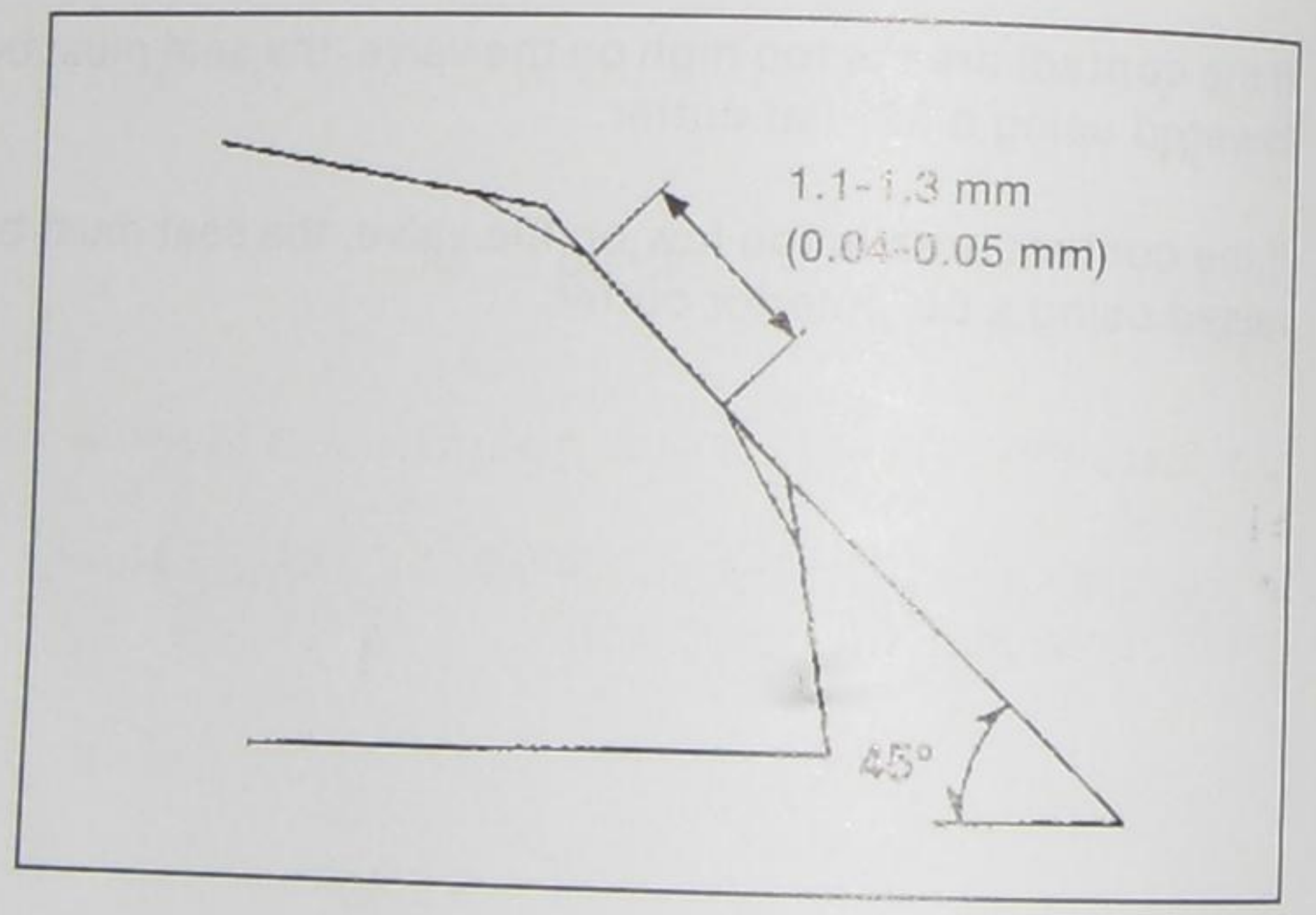

(1) OLD SEAT WIDTH
32°

Using a 60° interior cutter, remove 1/4 of the existing valve seat material.

| **TOOLS:** | |
|---|---|
| **Interior cutter, 30 mm (60° IN/EX)** | **07780-0014000** |
| **Cutter holder, 5.5 mm** | **07781-0010101** |


(1) OLD SEAT WIDTH
60°

Using a 45° seat cutter, cut the seat to the proper width.


1.1-1.3 mm
(0.04-0.05 mm)
45°

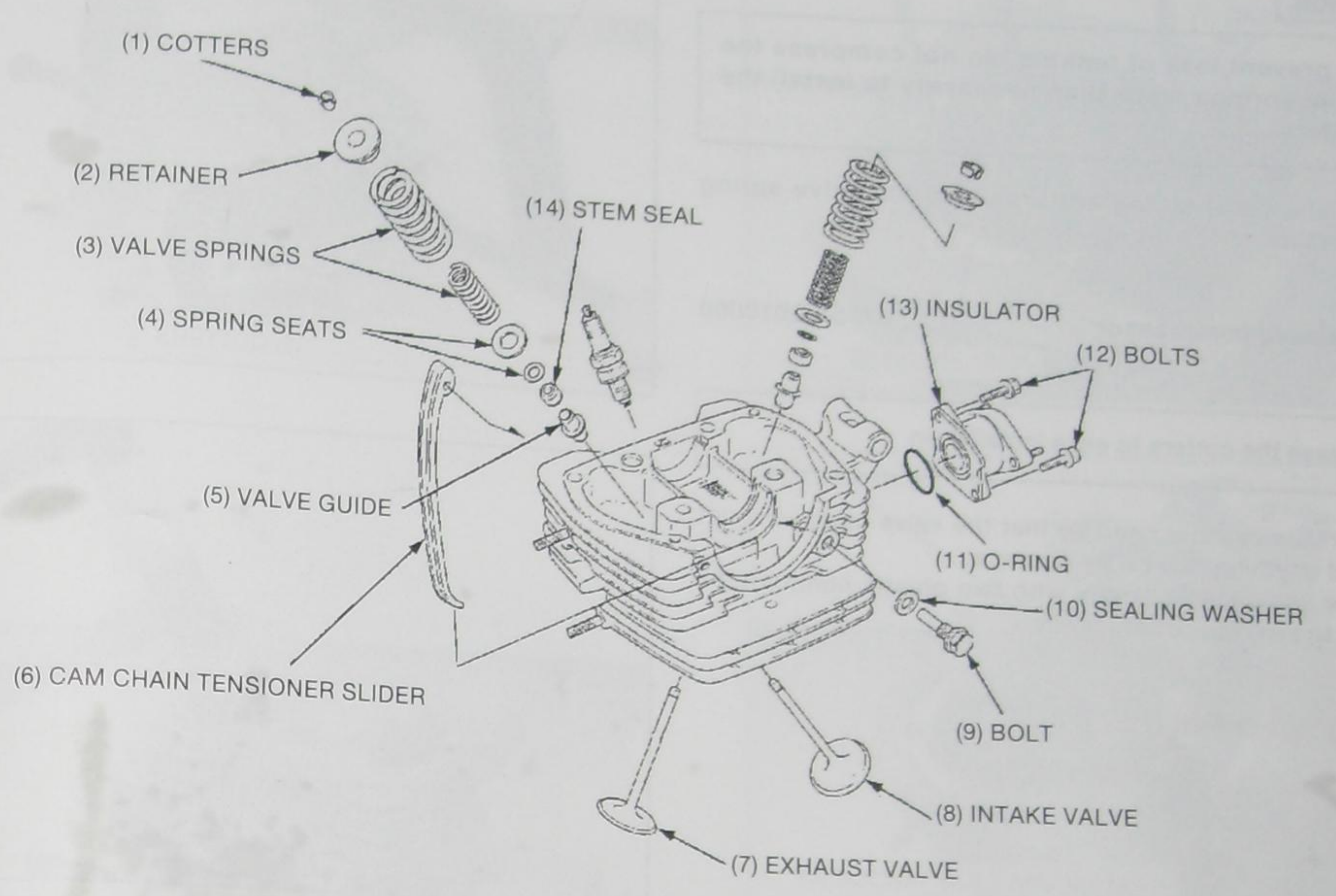
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

CAUTION

- **Excessive lapping pressure may deform or damage the seat.**
- **Change the angle of lapping tool frequently to prevent uneven seat wear.**
- **Do not allow lapping compound to enter the guides.**

After lapping, wash any residual compound off the cylinder head and valve and recheck the seat contact.

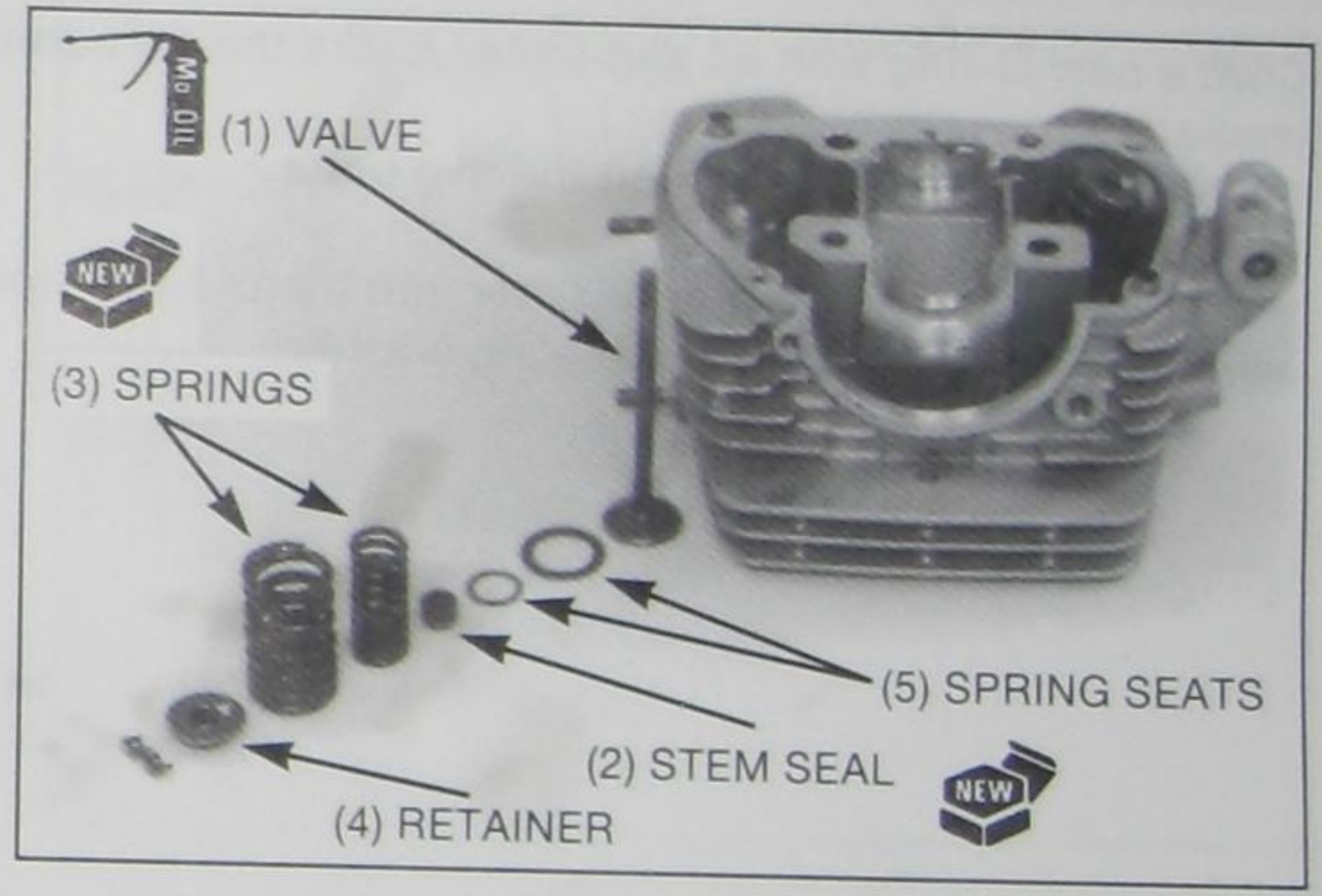
## Cylinder Head Assembly


(1) COTTERS
(2) RETAINER
(3) VALVE SPRINGS
(4) SPRING SEATS
(5) VALVE GUIDE
(6) CAM CHAIN TENSIONER SLIDER
(7) EXHAUST VALVE
(8) INTAKE VALVE
(9) BOLT
(10) SEALING WASHER
(11) O-RING
(12) BOLTS
(13) INSULATOR
(14) STEM SEAL

Blow through all oil passages in the cylinder head with compressed air.

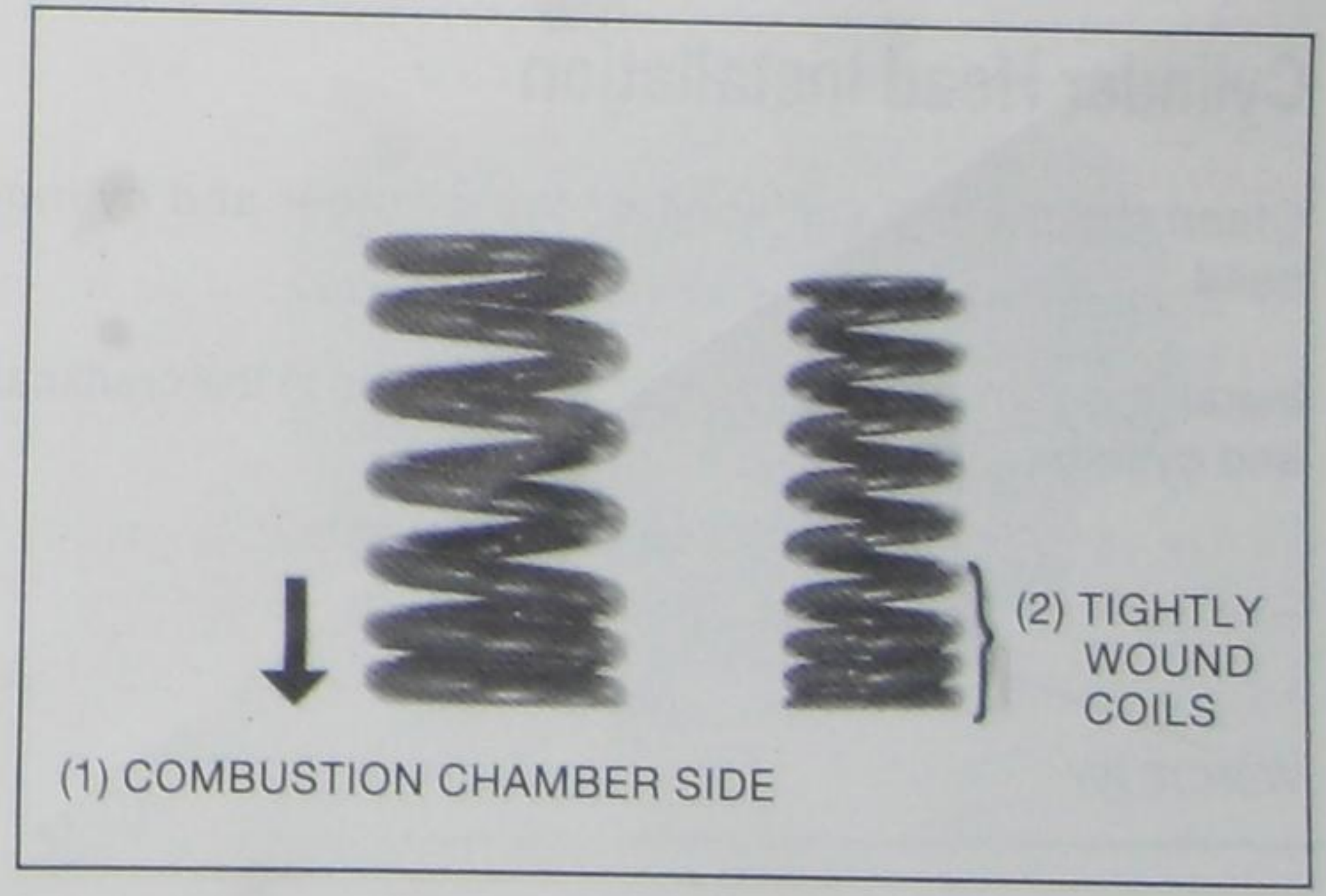
Install the inner and outer spring seats.
Install new stem seals.

Lubricate the valve stem sliding surface with molybdenum oil solution.
Insert the valve into the guide while turning it slowly to avoid damage to the stem seal.


(1) VALVE
NEW
(3) SPRINGS
(5) SPRING SEATS
(2) STEM SEAL
NEW
(4) RETAINER

Install the inner and outer valve springs with the tightly wound coils facing the combustion chamber.

Install the spring retainer.


(2) TIGHTLY WOUND COILS
(1) COMBUSTION CHAMBER SIDE

**CAUTION**

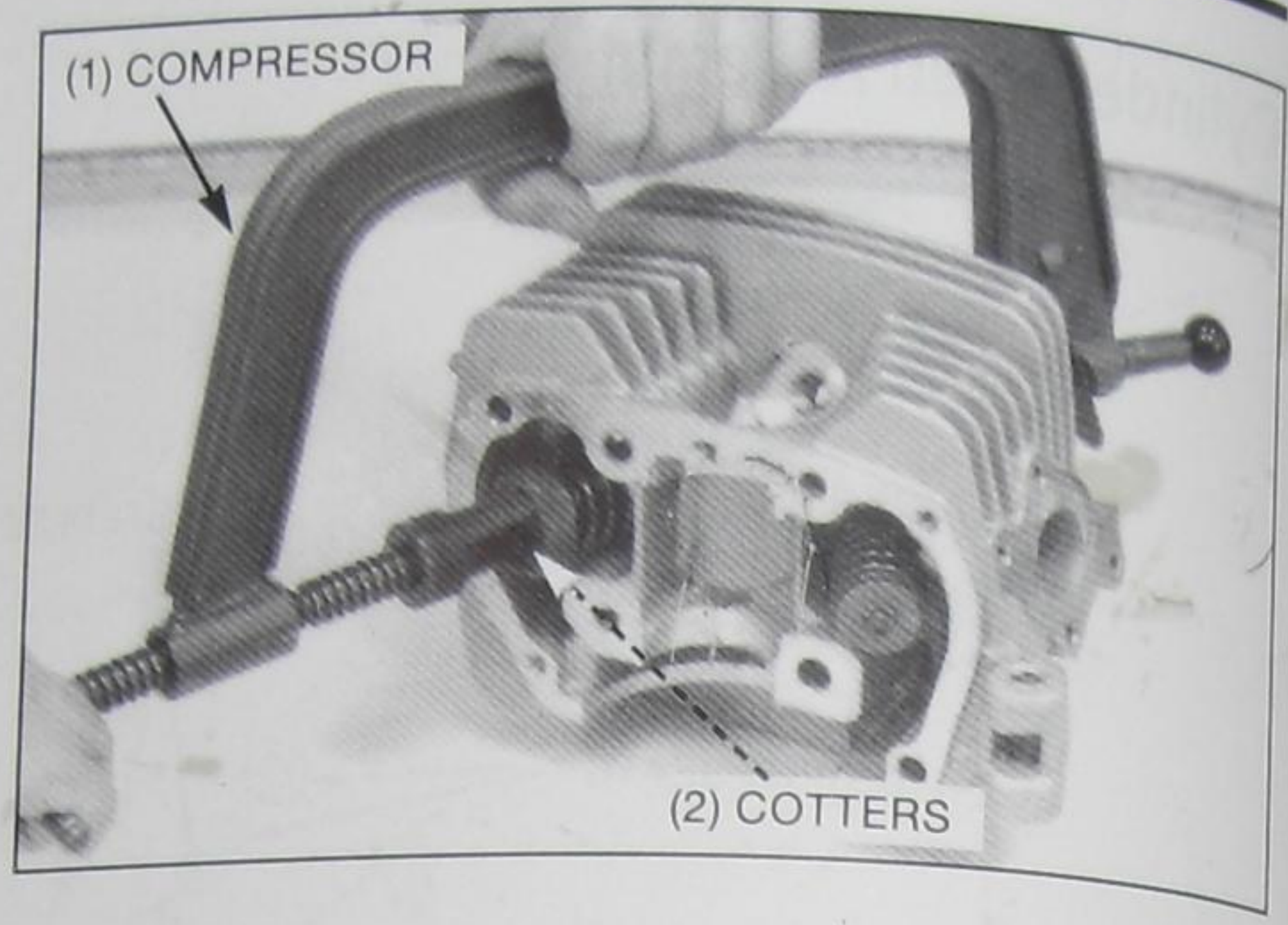
- **To prevent loss of tension, do not compress the valve springs more than necessary to install the cotters.**

Install the valve spring cotters using the valve spring compressor.

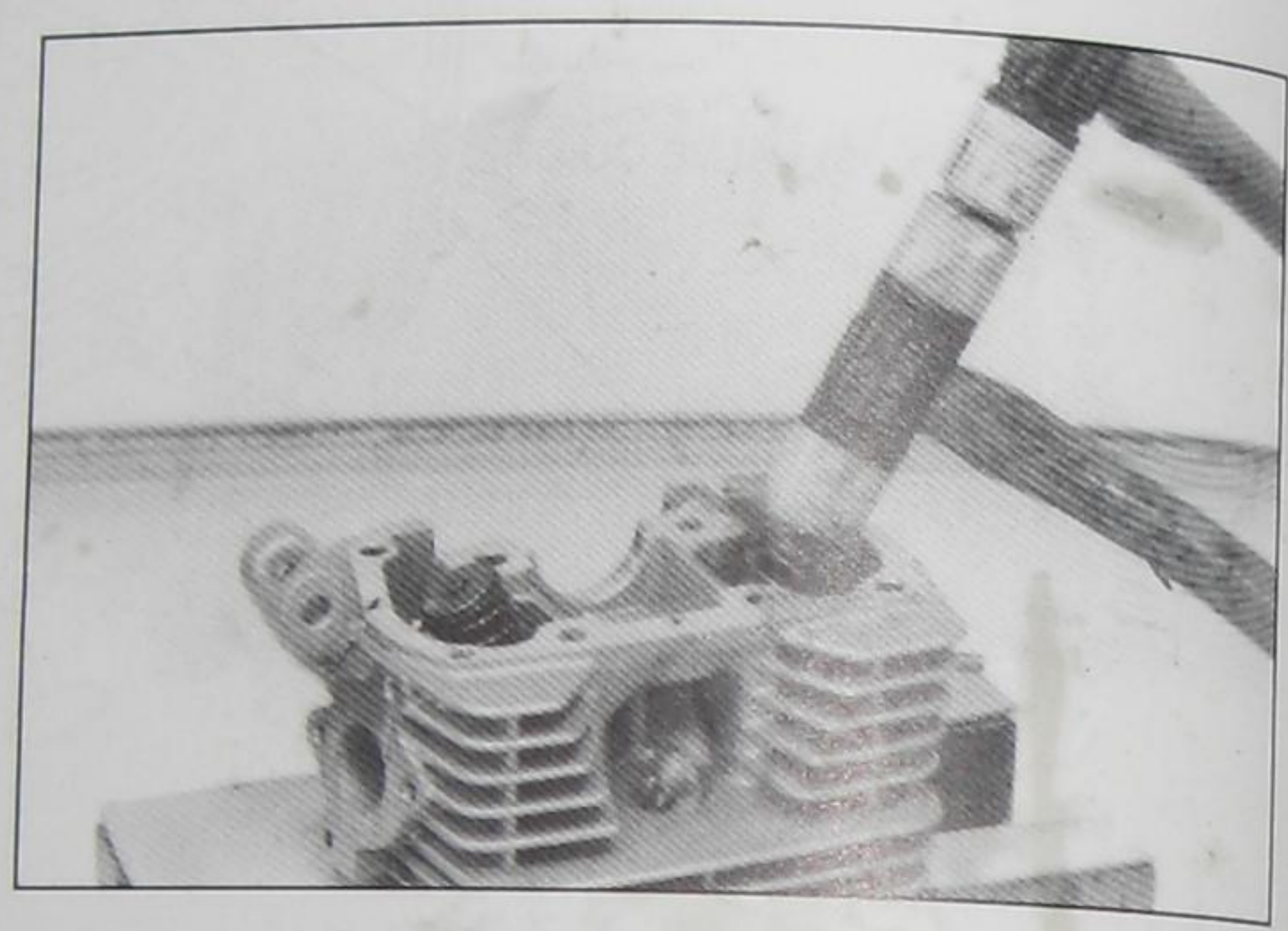
| **TOOL:** | |
|---|---|
| **Valve spring compressor** | **07757-0010000** |

NOTE:

- Grease the cotters to ease installation.

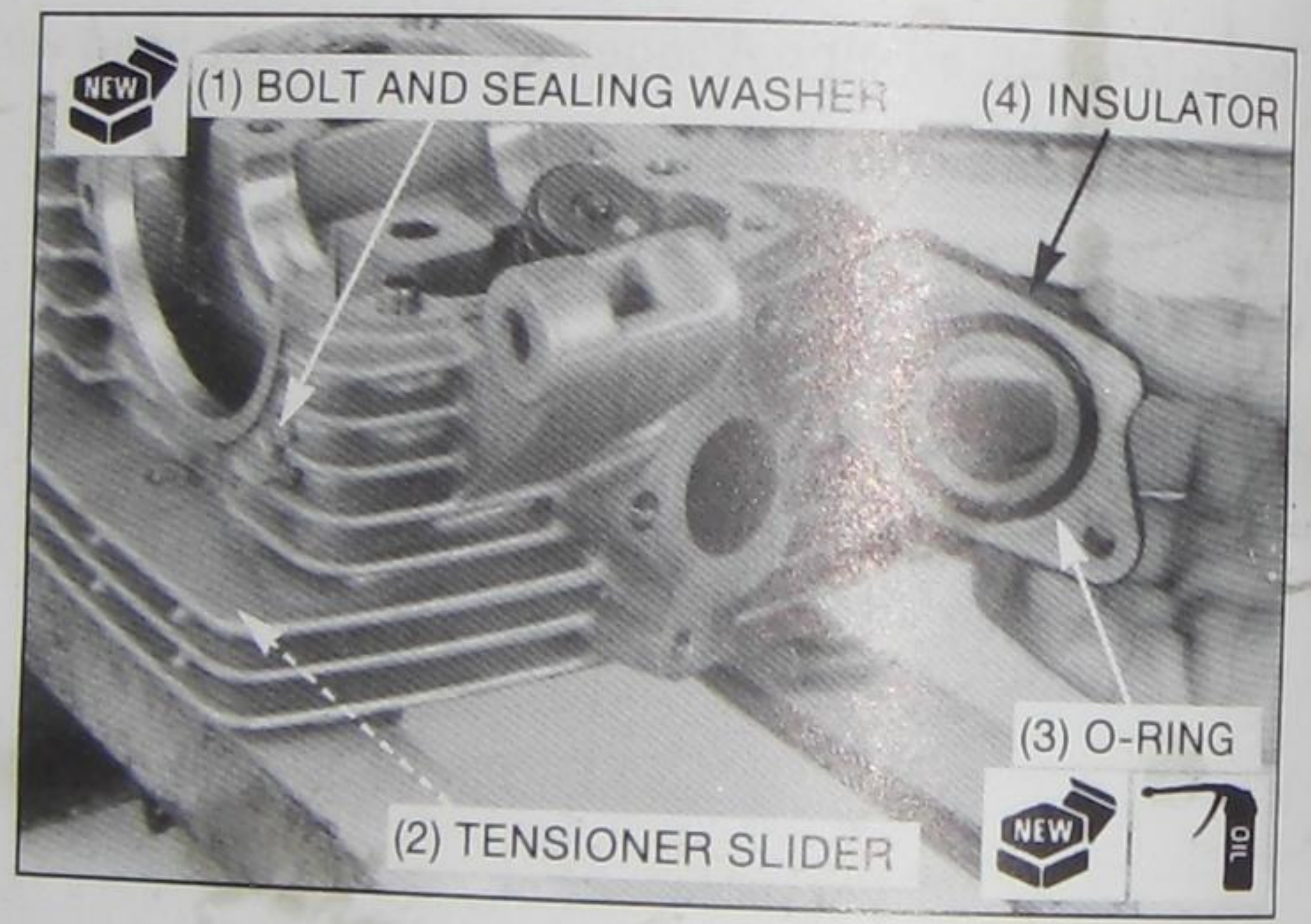

(1) COMPRESSOR
(2) COTTERS

Support the cylinder head so that the valve heads will not contact anything that cause damage.
Tap the valve stems gently with two plastic hammers as shown to seat the cotters firmly



Coat a new O-ring with oil and install it into the carburetor insulator groove.
Install the insulator and tighten the two bolts.

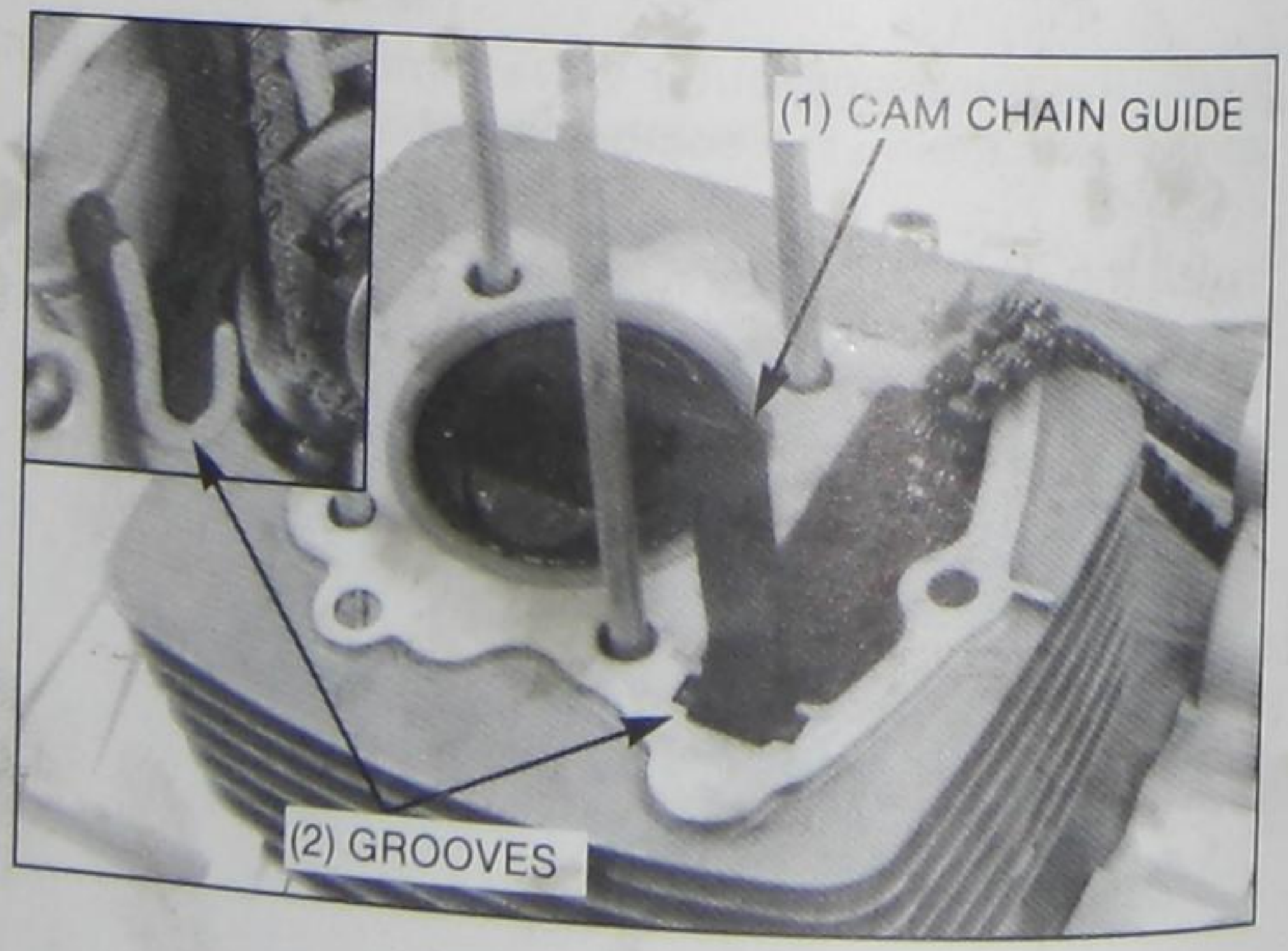
Install the cam chain tensioner slider into the cylinder head with the pivot bolt and a new sealing washer.


NEW
(1) BOLT AND SEALING WASHER
(4) INSULATOR
(3) O-RING
NEW
OIL
(2) TENSIONER SLIDER

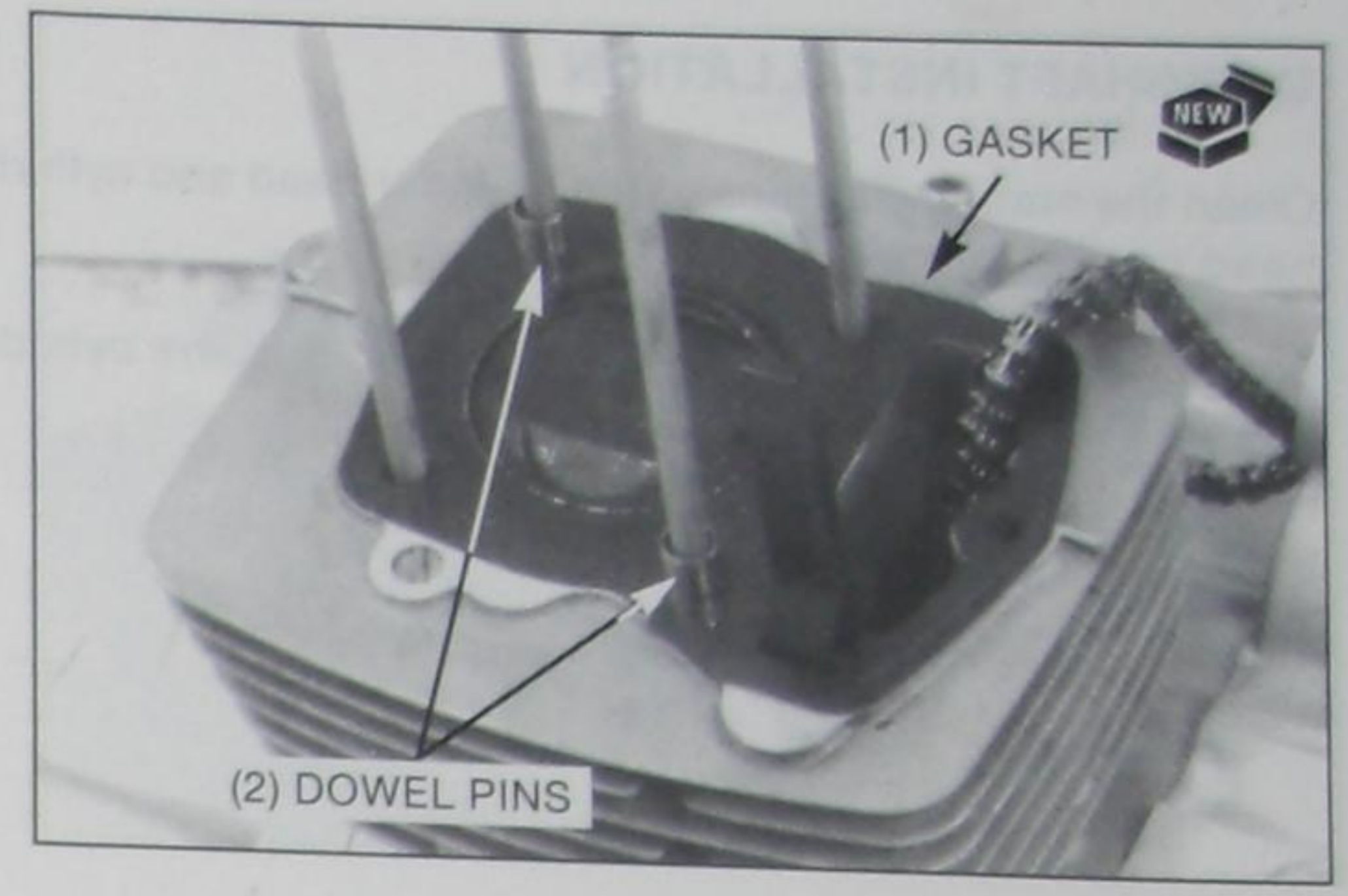
## Cylinder Head Installation

Clean the mating surfaces of the cylinder and cylinder head.

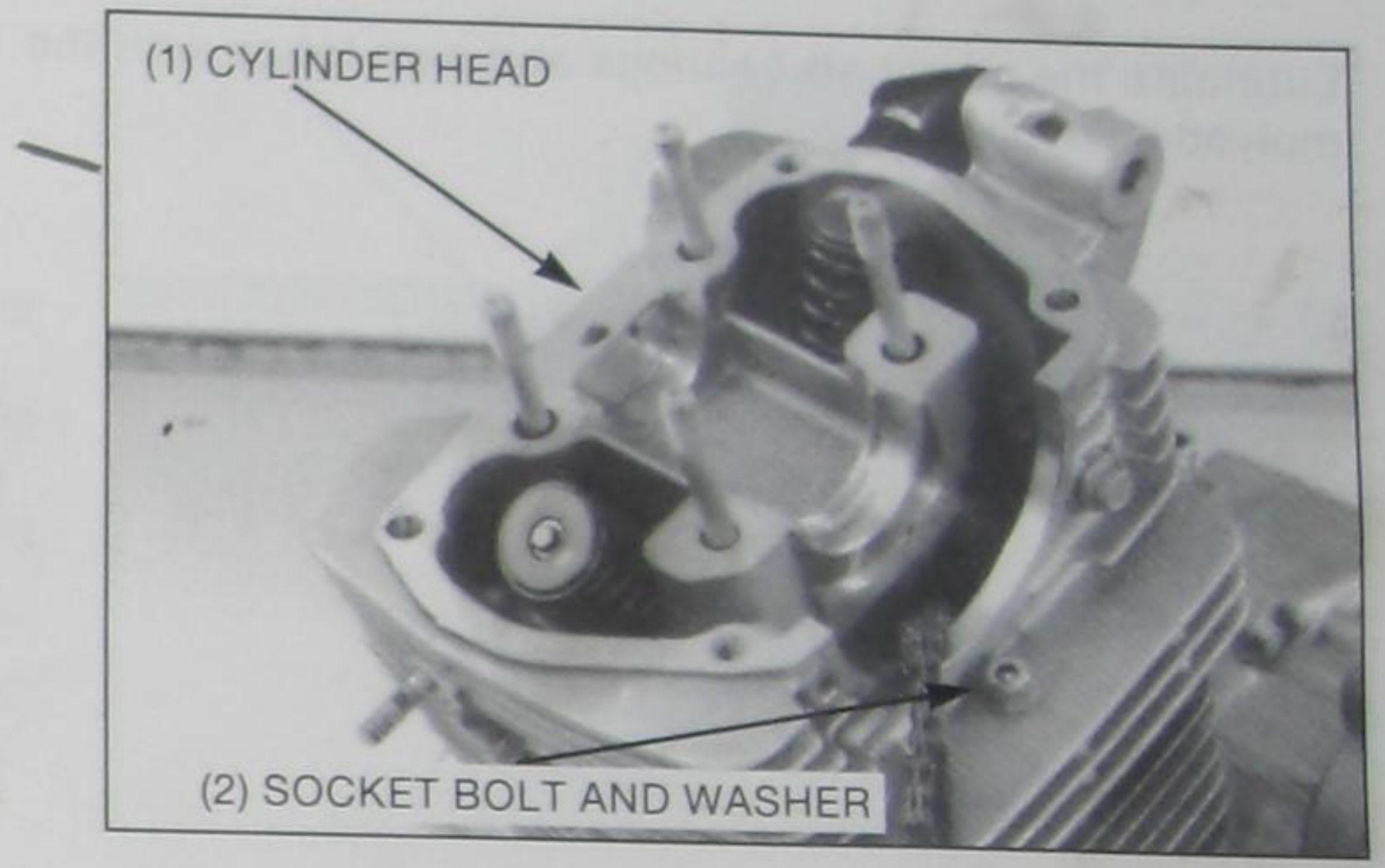
Install the cam chain guide into the grooves in the crankcase and cylinder.


(1) CAM CHAIN GUIDE
(2) GROOVES

Install the dowel pins and a new gasket.


(1) GASKET
NEW
(2) DOWEL PINS

Install the cylinder head onto the cylinder
Install the socket bolt with the washer.

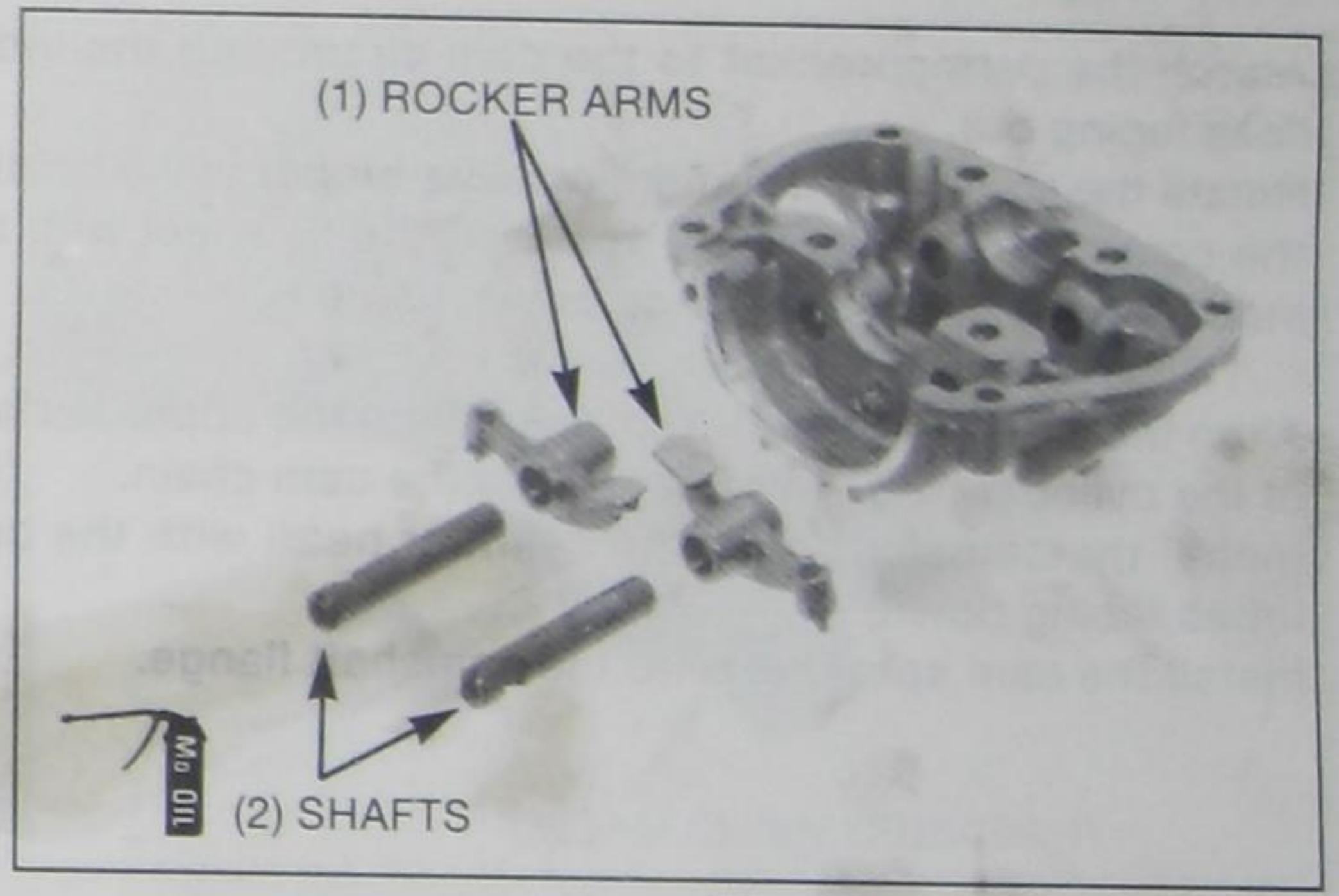

(1) CYLINDER HEAD
(2) SOCKET BOLT AND WASHER

## Cylinder Head Cover/Camshaft Installation

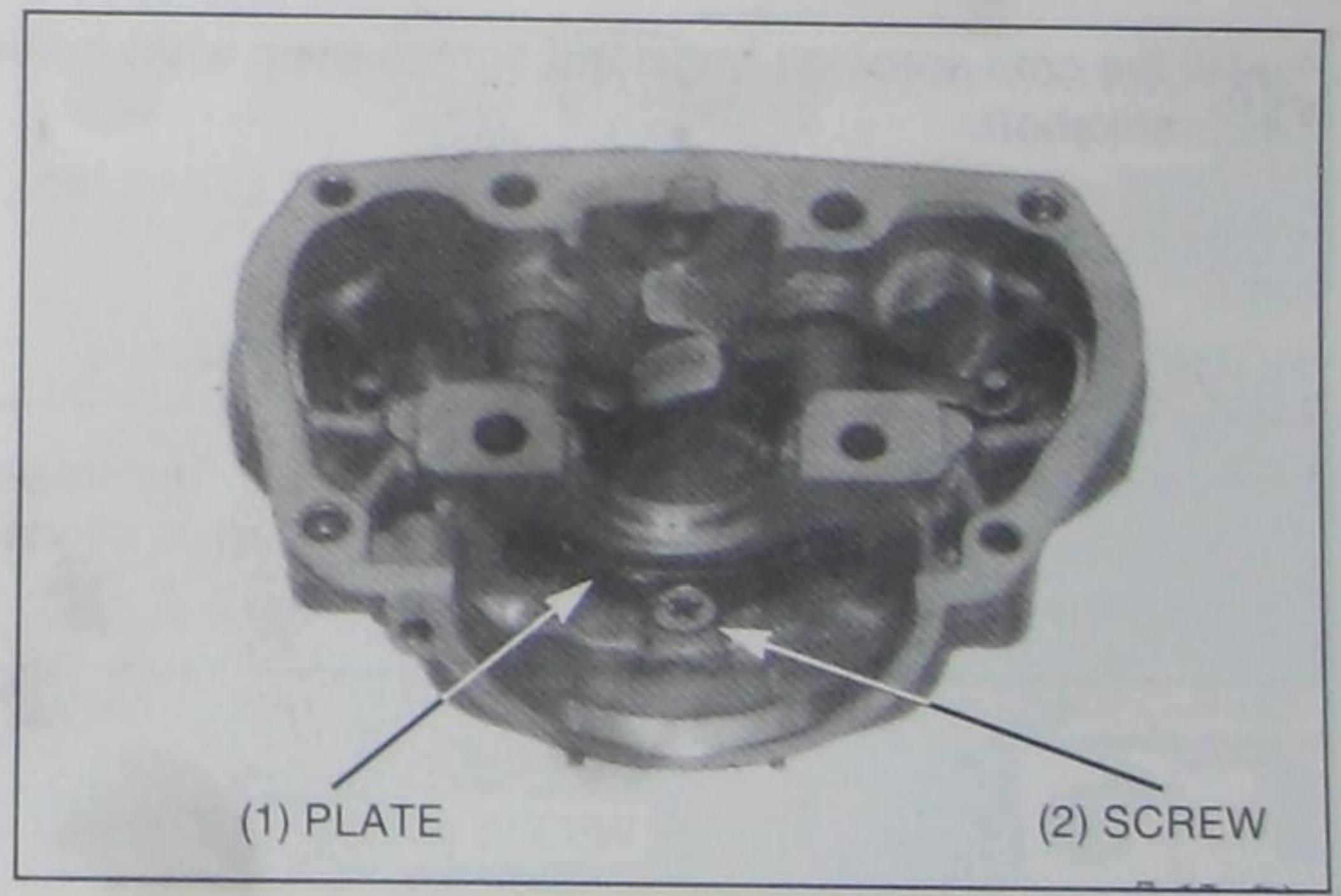
### ROCKER ARM INSTALLATION

Apply molybdenum oil solution to the rocker arm shaft sliding surfaces.

Set the rocker arm into the cylinder head cover and install the rocker arm shaft through the rocker arm.


(1) ROCKER ARMS
M OIL
(2) SHAFTS

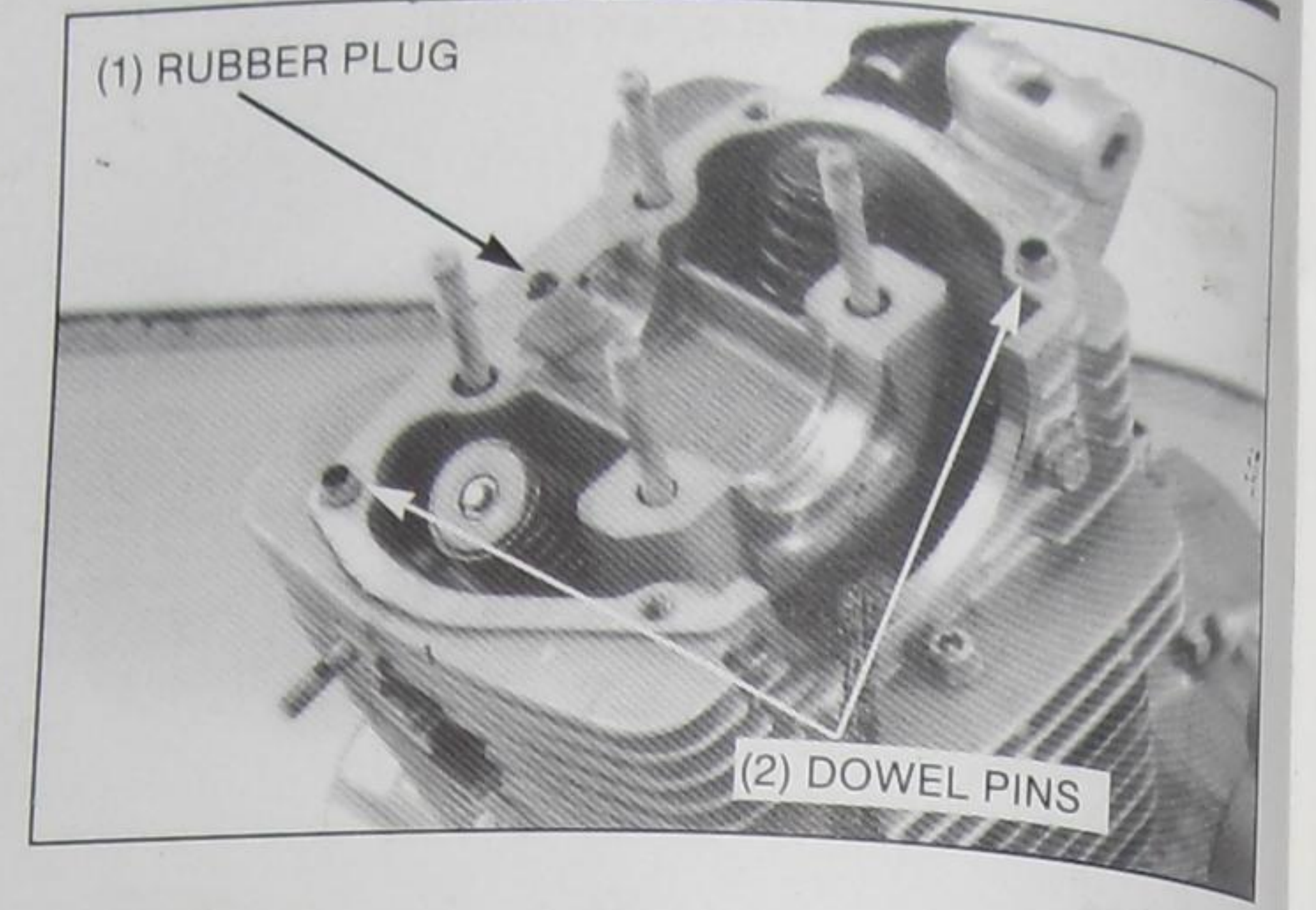
Install the setting plate so that it ends aligned with the cutouts of the rocker arm shafts.
Install the attaching screw and tighten it securely.


(1) PLATE
(2) SCREW

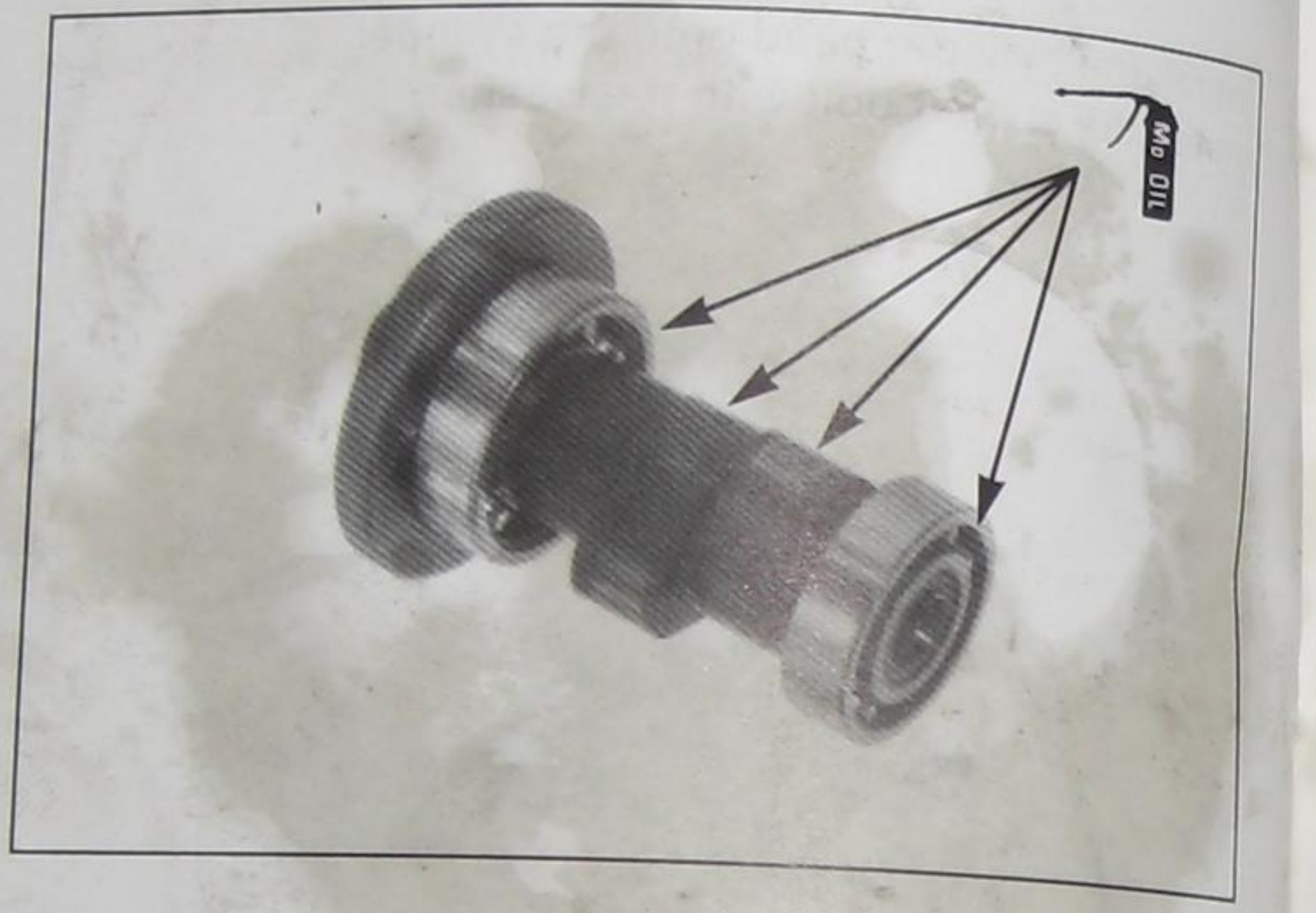
### CAMSHAFT INSTALLATION

Clean the mating surfaces of the cylinder head and cylinder head cover.

Install the dowel pins and the rubber plug into the cylinder head.

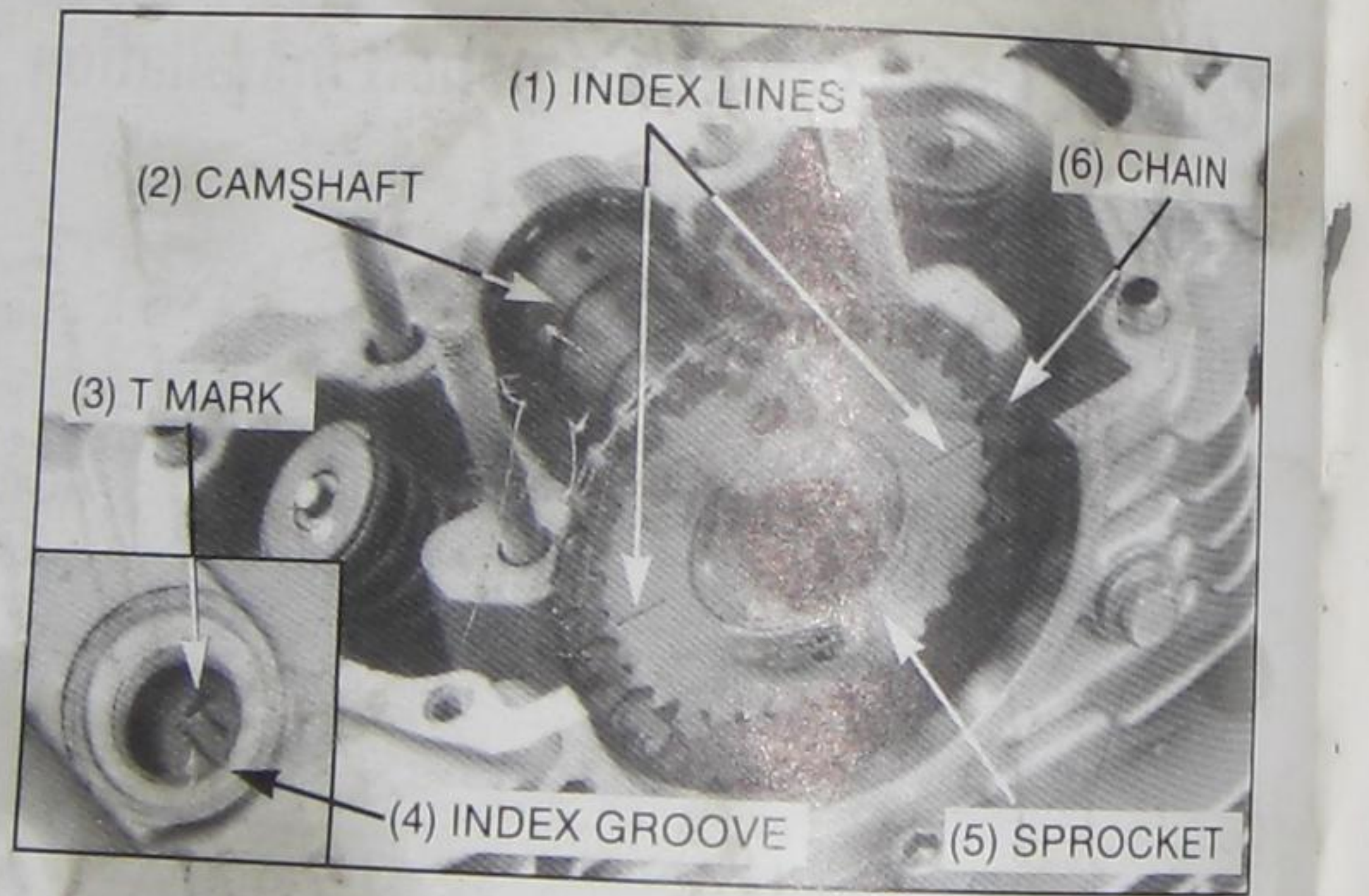


Lubricate the camshaft bearings and cam lobes with the molybdenum oil solution.



Attach the cam sprocket to the cam chain with the index lines facing out.
Rotate the crankshaft counterclockwise slowly while holding the cam chain to align the T mark on the flywheel with the index groove in the crankcase cover.

Align the index lines on the sprocket with the upper surface of the cylinder head without moving the cam chain.
Install the camshaft onto the cylinder head with the cam lobes facing down.
Install the cam sprocket onto the camshaft flange.

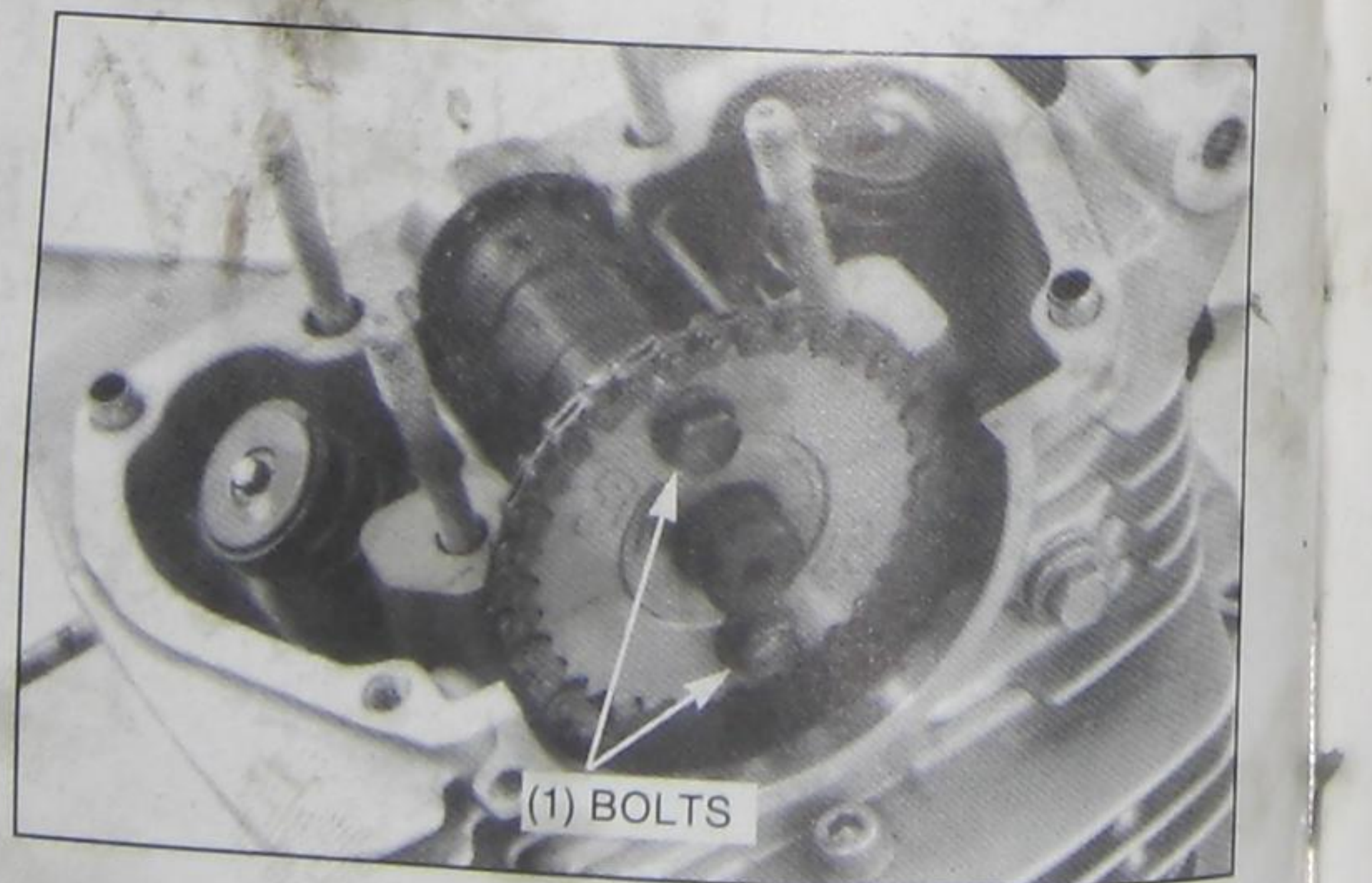


Install the cam sprocket bolts and tighten them while holding the crankshaft.

**TORQUE: 12 N·m (1.2 kgf-m, 9 lbf-ft)**

NOTE:

- Make sure that the index lines align with the upper surface of the cylinder head when the T mark is aligned with the index groove.

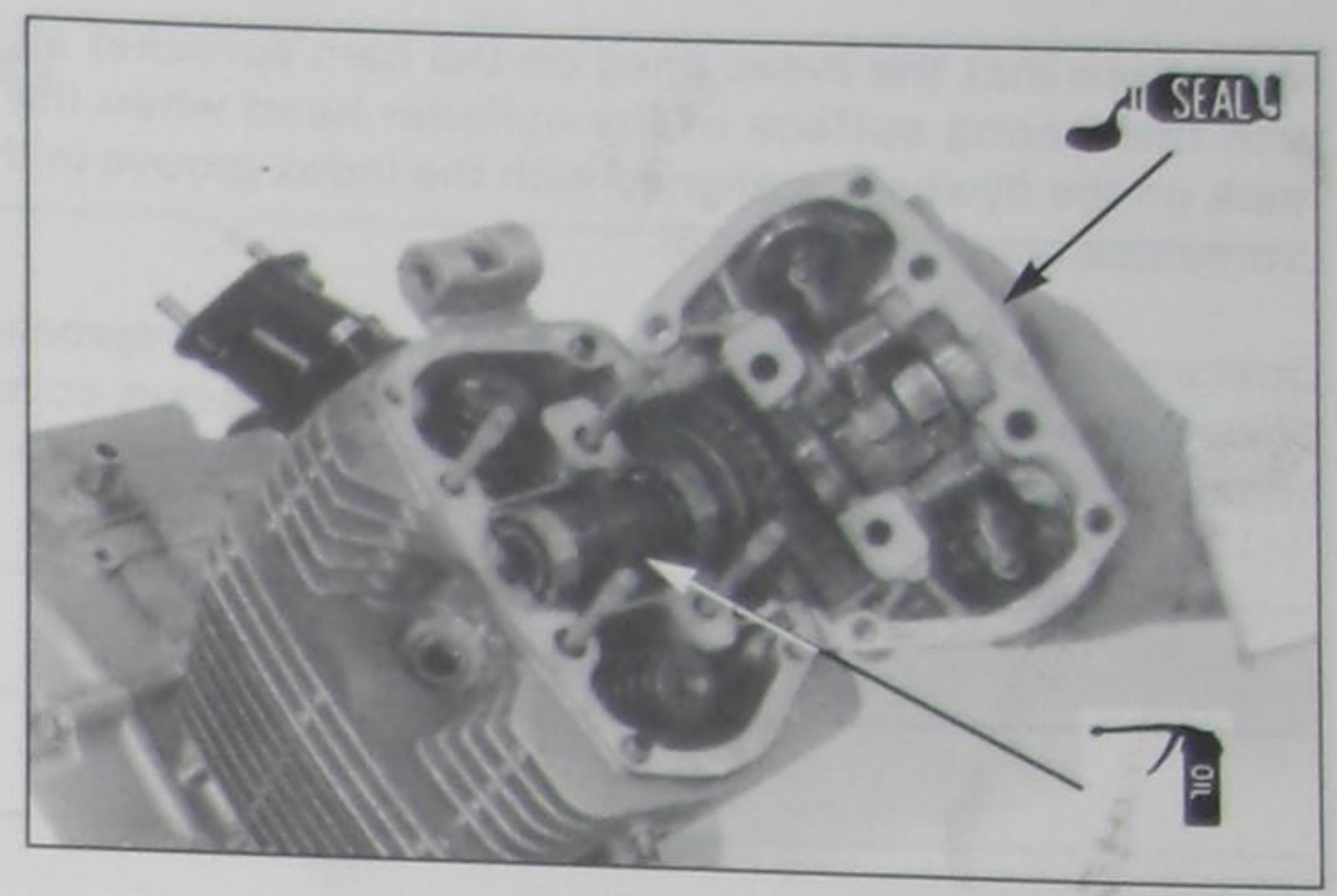


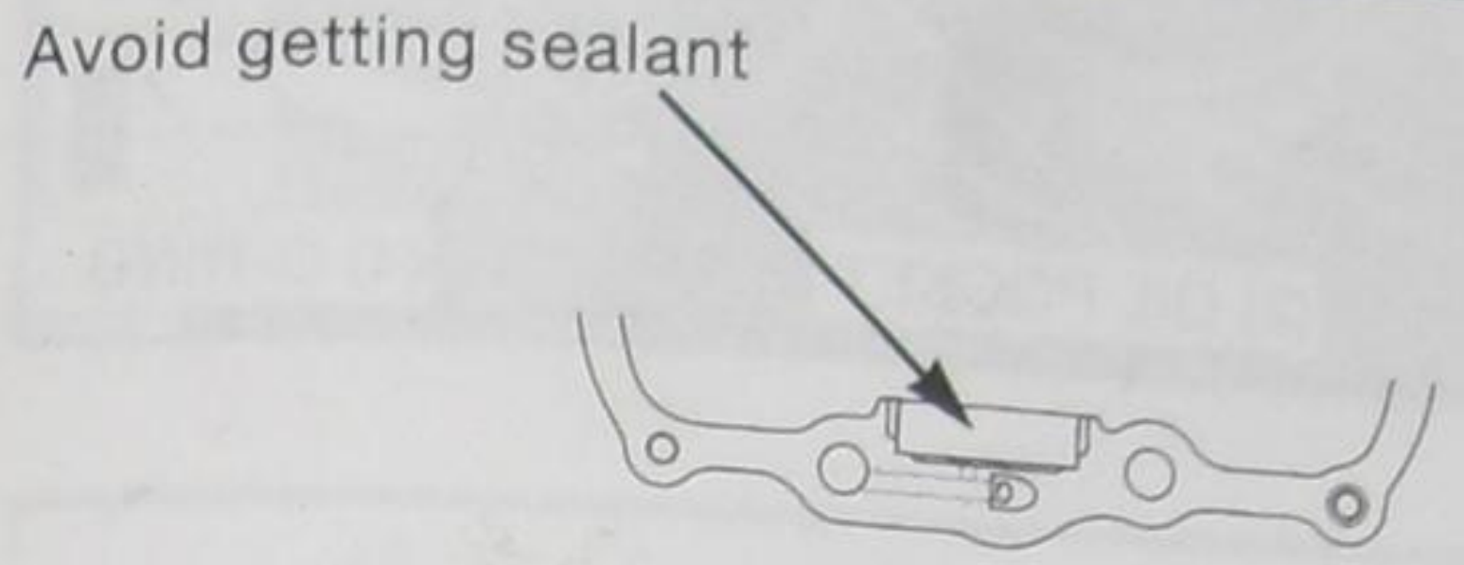
### CYLINDER HEAD COVER INSTALLATION

Apply liquid sealant to the mating surface of the cylinder head cover.

NOTE:

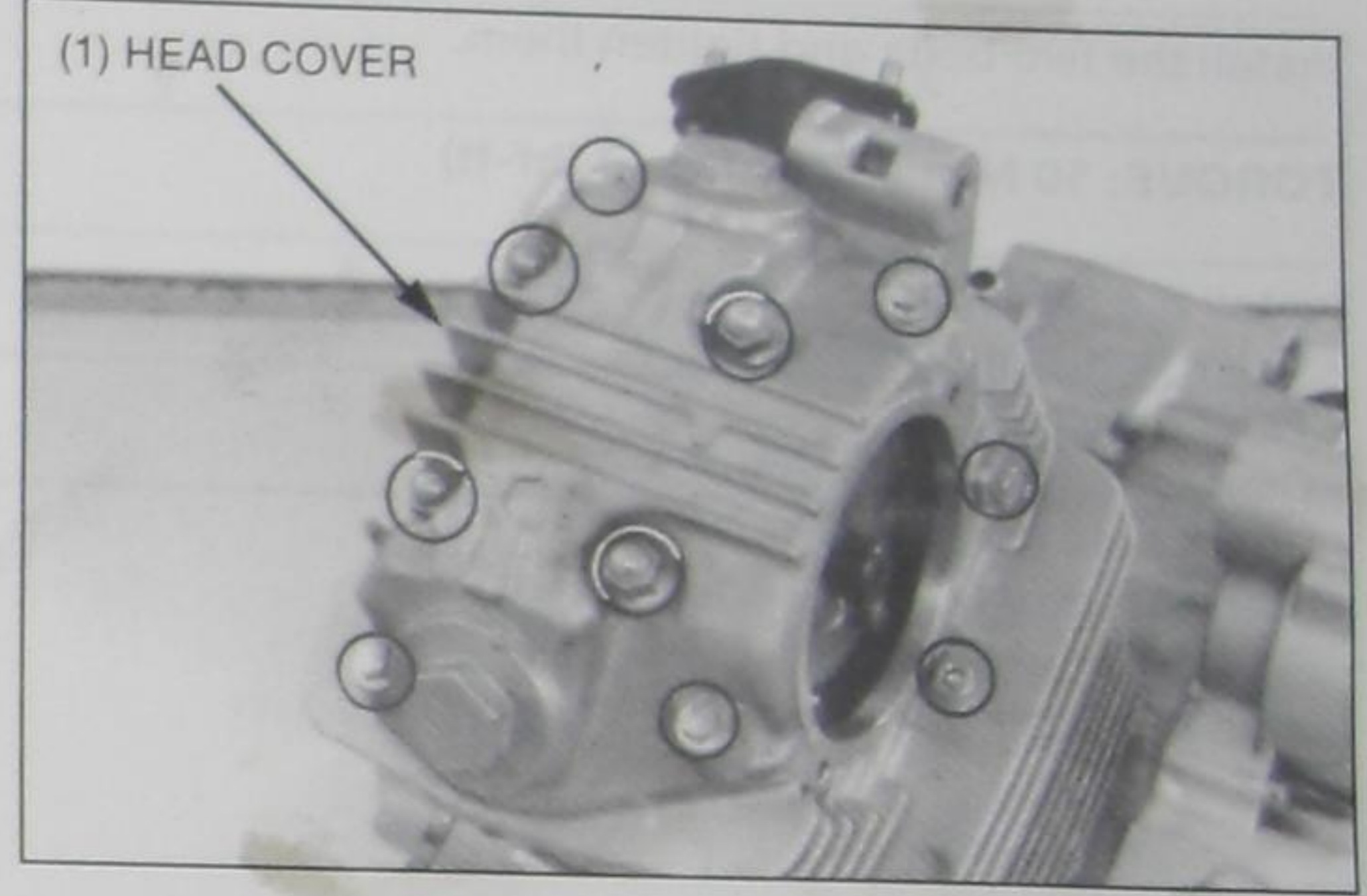
- Do not get sealant into the oil passages. Sealant in these locations could cause lubrication failure.





Pour engine oil into the oil pocket in the cylinder head.

Install the cylinder head cover onto the cylinder head.
Apply oil to the head cover cap nut threads and seating surfaces.
Install the head cover bolts and cap nuts with a new sealing washers.
Tighten the nuts and bolts in a crisscross pattern in 2-3 steps.

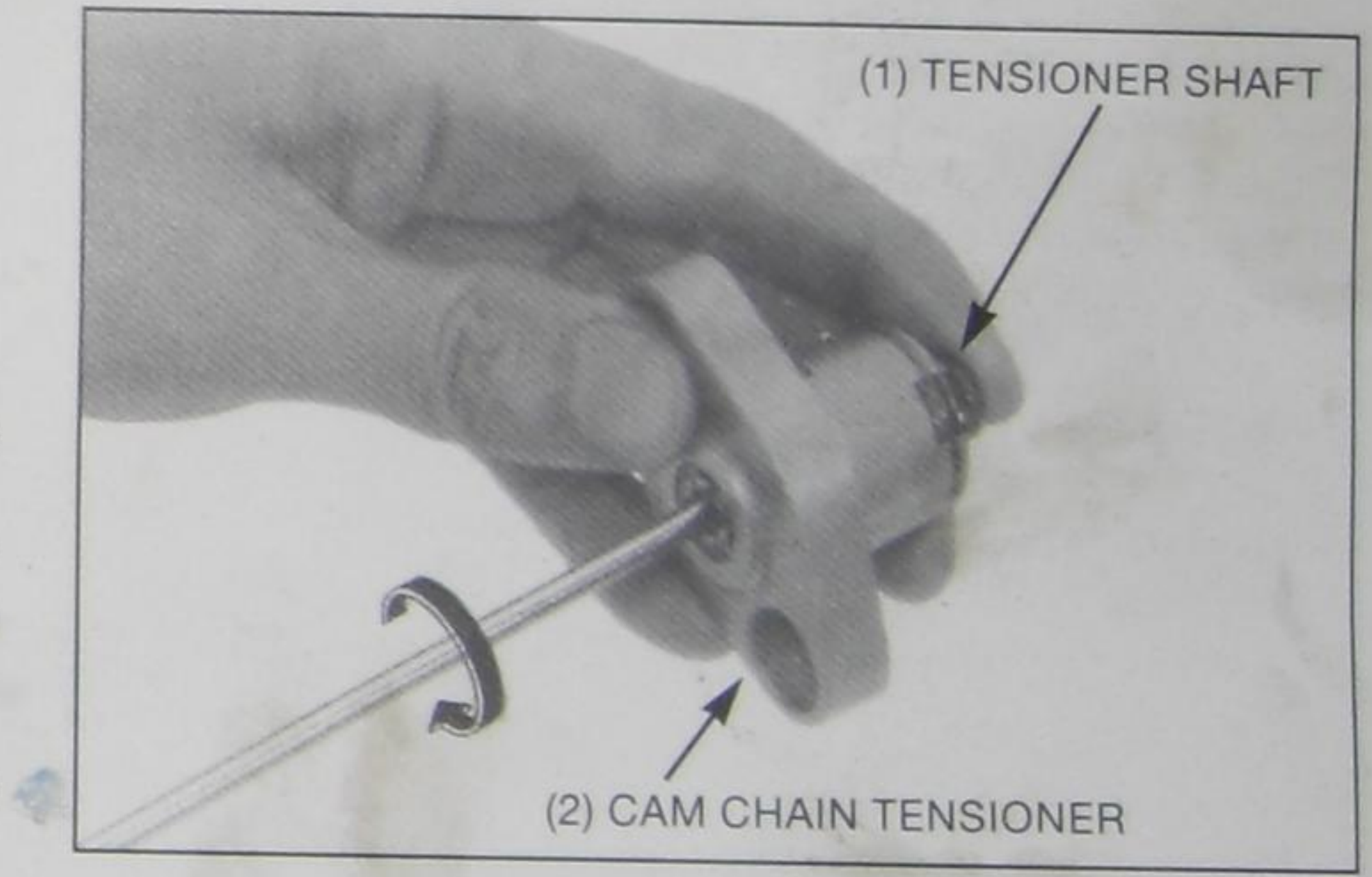


**TORQUE:**
**Head cover cap nut: 26 N·m (2.7 kgf-m, 20 lbf-ft)**
**Head cover bolt: 12 N·m (1.2 kgf-m, 9 lbf-ft)**
**Cylinder head socket bolt: 10 N·m (1.0 kgf-m, 7 lbf-ft)**

Tighten the tensioner slider pivot bolt.

**TORQUE: 10 N·m (1.0 kgf-m, 7 lbf-ft)**

Remove the tensioner sealing screw.
Before installing the cam chain tensioner, check the following:
- The tensioner shaft should not go into the body when it is pushed.
- When it is turned clockwise with a screwdriver, the tensioner shaft should be pulled into the body. The shaft spring out of the body as soon as the screwdriver is released.



Turn the tensioner shaft clockwise with a screwdriver to retract the tensioner until it is locked.

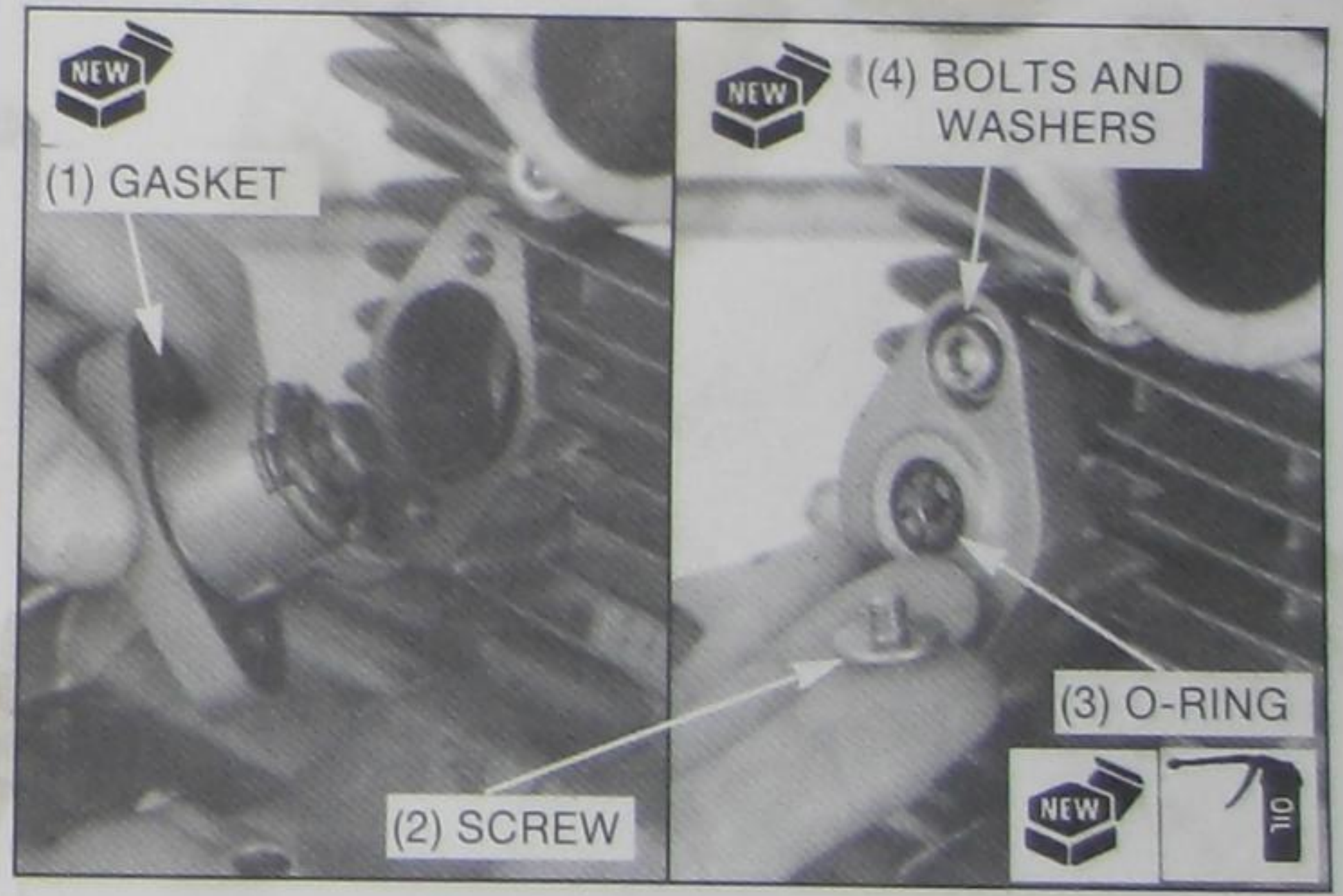
Install the cam chain tensioner into the cylinder with a new gasket.
Install the two mounting bolts with new sealing washers and tighten them.

**TORQUE: 12 N·m (1.2 kgf-m, 9 lbf-ft)**

Turn the tensioner shaft counterclockwise slightly to release the tensioner.

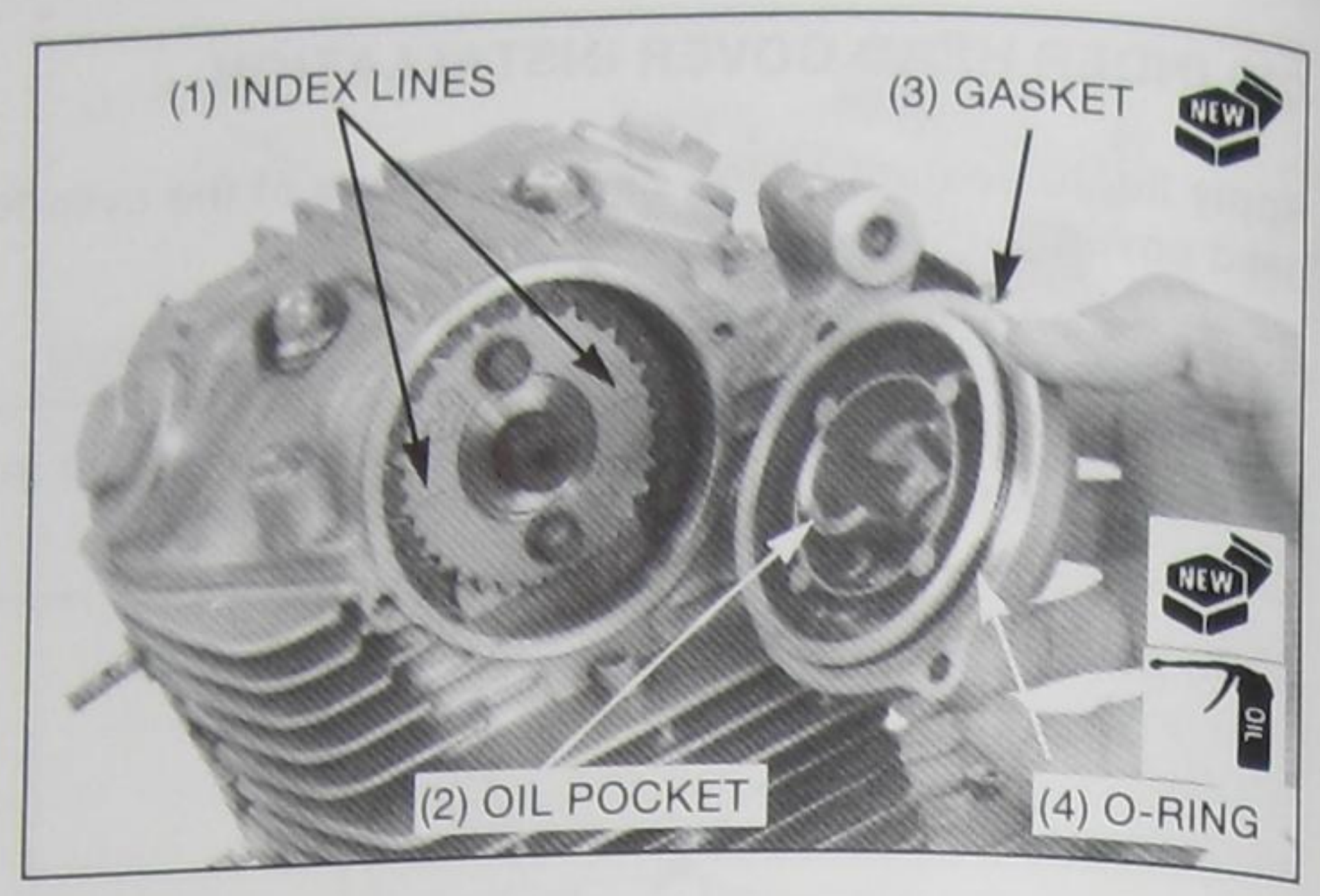
Coat a new O-ring with oil and install it into the tensioner groove.
Install the sealing screw and tighten it.

**TORQUE: 4 N·m (0.4 kgf-m, 2.9 lbf-ft)**



Make sure that the index lines on the cam sprocket align with the mating surface of the cylinder head when the T mark on the flywheel is aligned with the index groove in the crankcase cover (page 7-16).

Coat a new O-ring with oil and install it into the cam sprocket cover groove. Install a new gasket onto the sprocket cover. Install the sprocket cover with its oil pocket facing down.

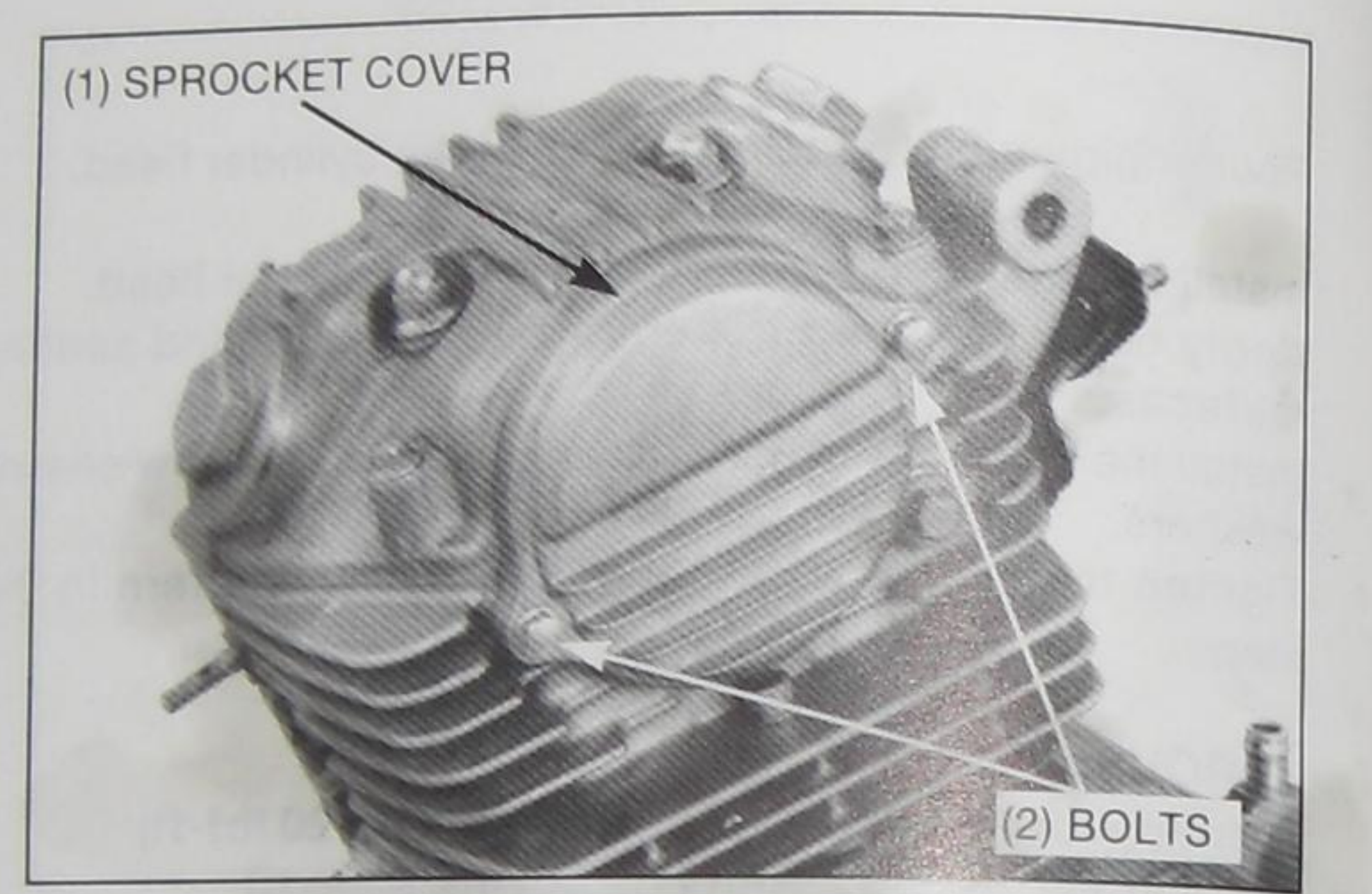

(1) INDEX LINES
(3) GASKET
NEW
NEW
OIL
(2) OIL POCKET
(4) O-RING

Install the two bolts and tighten them.

**TORQUE: 10 N·m (1.0 kgf-m, 7 lbf-ft)**

Install the following:
- Valve adjusting hole caps
- Timing hole cap
- Crankshaft hole cap (page 3-6)
- Spark plug (page 3-6)
- Starter motor (page 17-9).

Install the engine in the frame (section 6).


(1) SPROCKET COVER
(2) BOLTS

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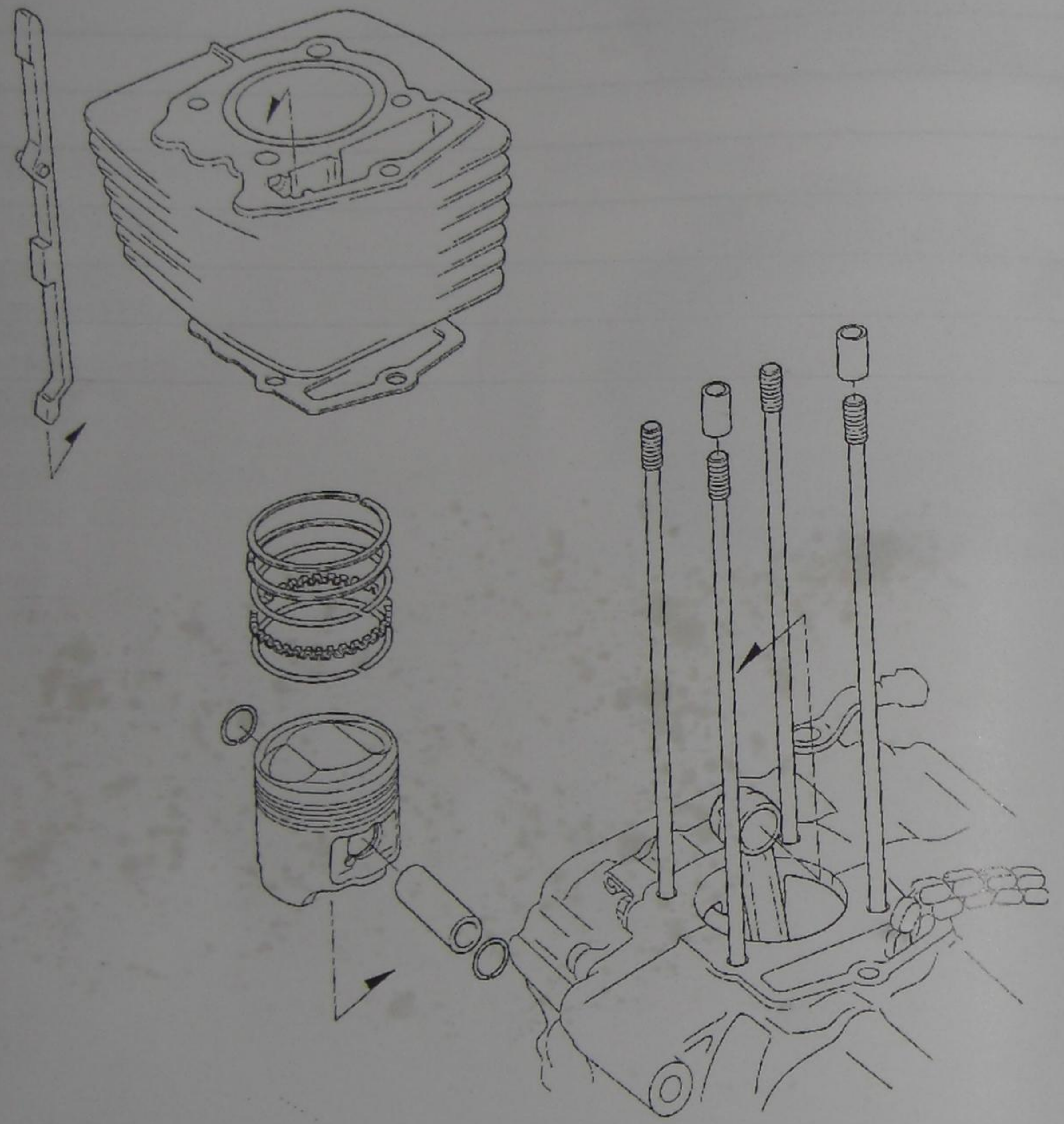
## MEMO



# 8. Cylinder/Piston

| | | | |
|---|---|---|---|
| SERVICE INFORMATION | 8-1 | CYLINDER/PISTON REMOVAL | 8-2 |
| TROUBLESHOOTING | 8-1 | CYLINDER/PISTON INSTALLATION | 8-5 |

## Service Information

### GENERAL

- The engine must be removed from the frame to service the cylinder and piston.
- Do not damage mating surfaces by using a screwdriver when removing the cylinder.
- Take care not to damage the cylinder wall and piston.
- Camshaft lubricating oil is fed through the oil passage in the cylinder. Clean the oil passage before installing the cylinder.

### SPECIFICATIONS

Unit: mm (in)

| Item | | | Standard | Service Limit |
|---|---|---|---|---|
| Cylinder | I.D. | | 56.500-56.510 (2.2244-2.2248) | 56.60 (2.228) |
| | Out of round | | — | 0.08 (0.003) |
| | Taper | | — | 0.05 (0.002) |
| | Warpage | | — | 0.05 (0.002) |
| Piston, piston ring, piston pin | Piston O.D. | | 56.470-56.490 (2.4988-2.4996) | 56.42 (2.221) |
| | Piston pin hole I.D. | | 15.002-15.008 (0.5906-0.5909) | 15.04 (0.592) |
| | Piston pin O.D. | | 14.994-15.000 (0.5903-0.5906) | 14.96 (0.589) |
| | Piston-to-piston pin clearance | | 0.002-0.014 (0.0001-0.0006) | 0.07 (0.003) |
| | Piston ring-to-groove clearance | Top | 0.015-0.045 (0.0006-0.0018) | 0.10 (0.004) |
| | | Second | 0.015-0.045 (0.0006-0.0018) | 0.10 (0.004) |
| | Piston ring end gap | Top | 0.05-0.20 (0.002-0.008) | 0.05 (0.02) |
| | | Second | 0.05-0.20 (0.002-0.008) | 0.05 (0.02) |
| | | Oil (side rail) | 0.20-0.70 (0.008-0.028) | 0.09 (0.04) |
| Cylinder-to-piston clearance | | | 0.010-0.040 (0.0004-0.0016) | 0.15 (0.006) |
| Connecting rod small end I.D. | | | 15.010-15.028 (0.5909-0.5917) | 15.06 (0.593) |
| Connecting rod-to-piston pin clearance | | | 0.010-0.034 (0.0004-0.0013) | 0.10 (0.004) |

## Troubleshooting

**Compression too low, hard starting or poor performance at low speed**
- Worn, stuck or broken piston ring
- Worn or damaged cylinder or piston

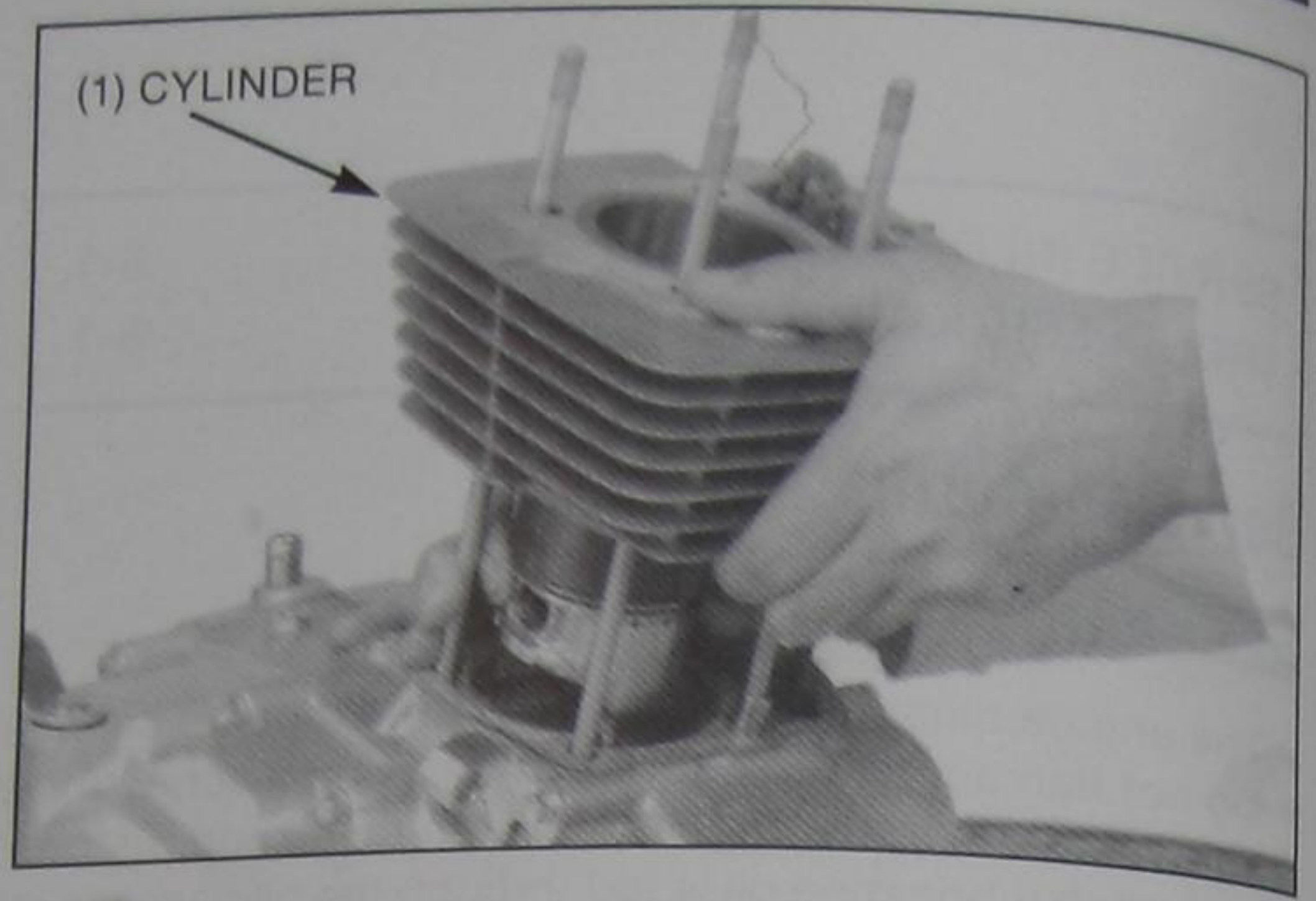
**Excessive smoke**
- Worn cylinder, piston or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

**Abnormal noise**
- Worn piston pin or piston pin hole
- Worn cylinder, piston or piston rings
- Worn connecting rod small end

## Cylinder/Piston Removal

Remove the cylinder head (page 7-3).

Remove the cylinder.

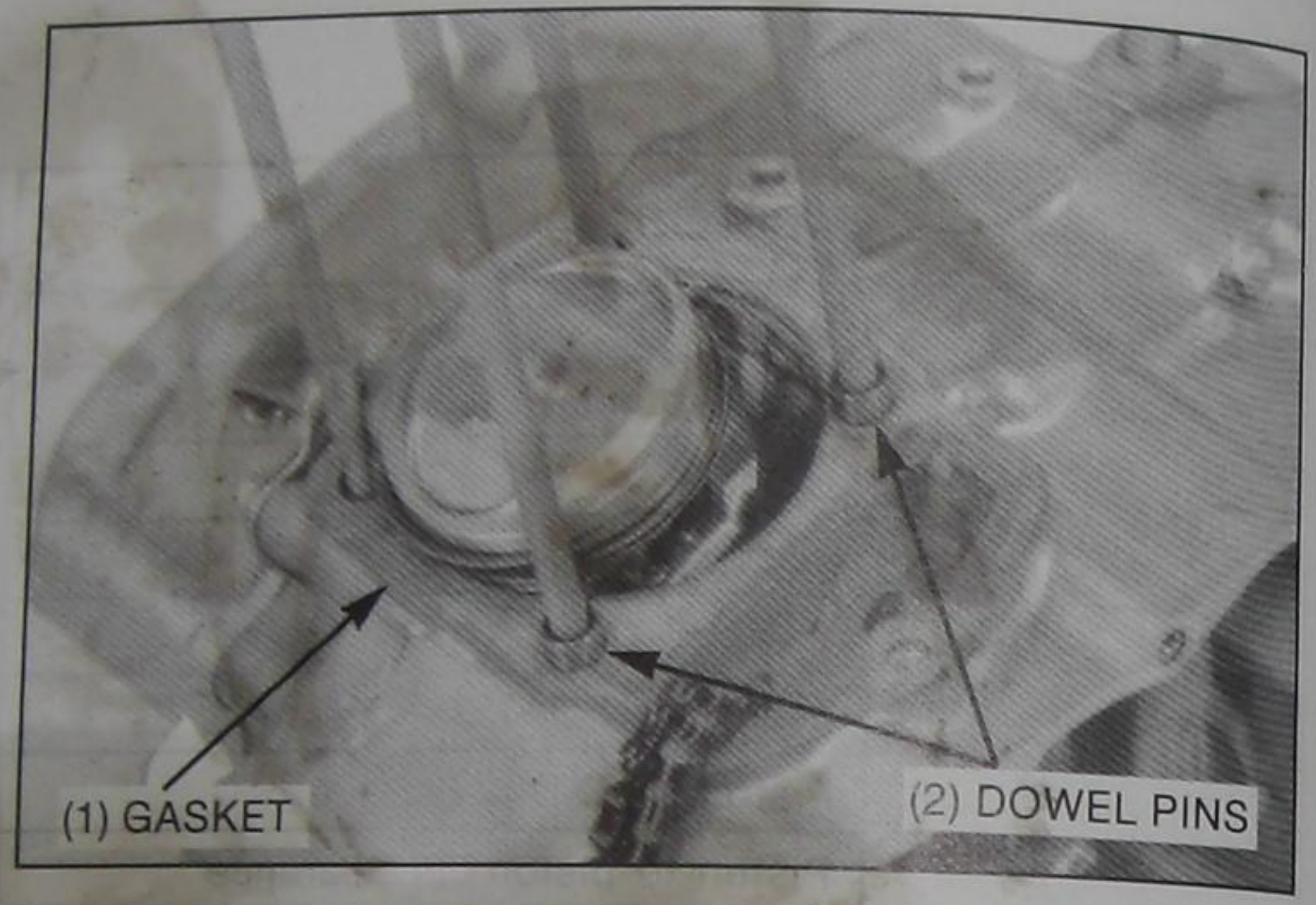


Remove the gasket and dowel pins.

**CAUTION**

- **Be careful not to damage the mating surface.**

Clean the cylinder.

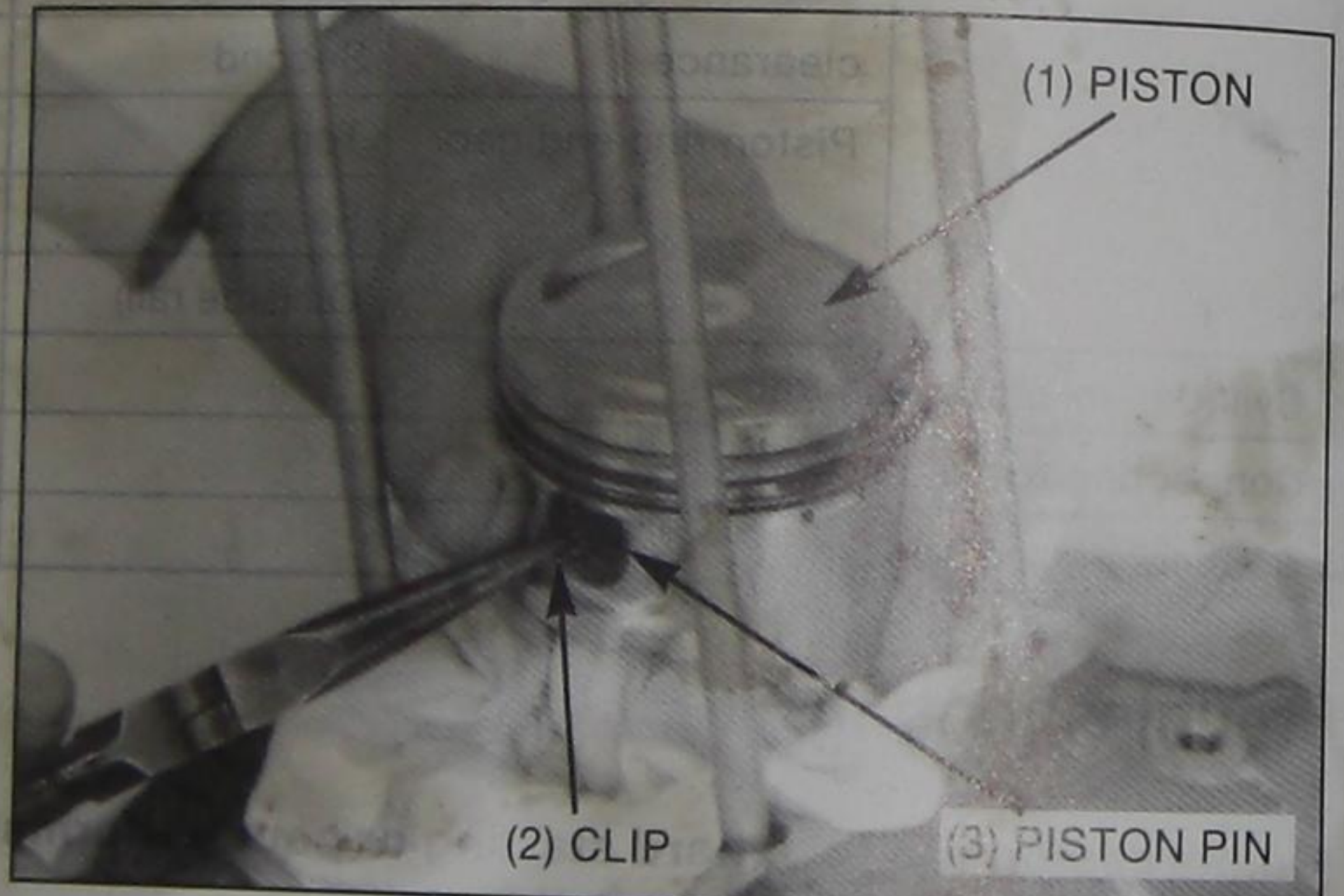


Place a clean shop towel over the crankcase to prevent the clip from falling into the crankcase.

Remove the piston pin clips with a pliers.
Push the piston pin out of the piston and connecting rod, and remove the piston.

**CAUTION**

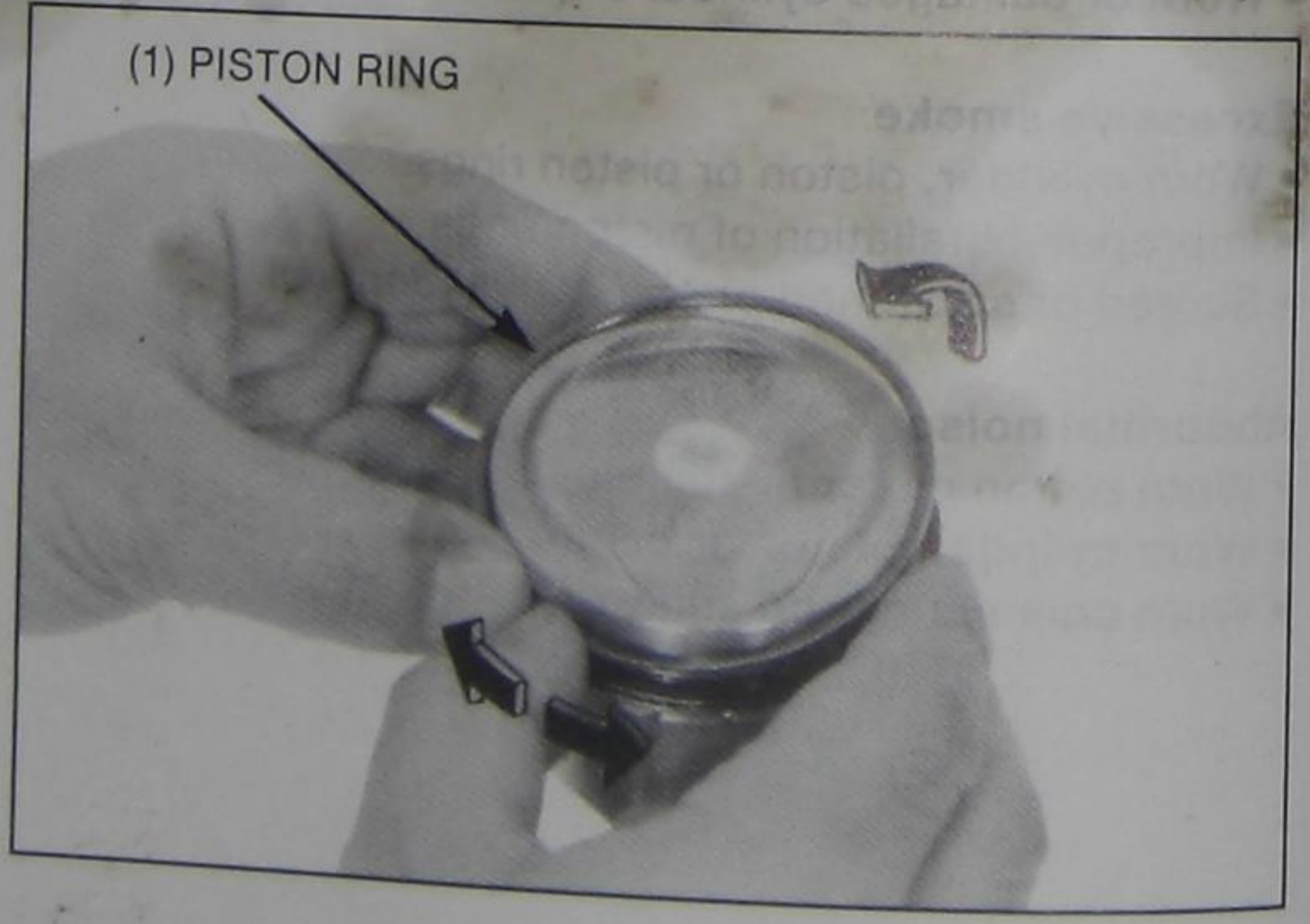
- **Be careful not to damage or scratch the piston sliding surface.**
- **Do not apply side force to the connecting rod.**



Spread each piston ring and remove it by lifting up at a point opposite the gap.

**CAUTION**

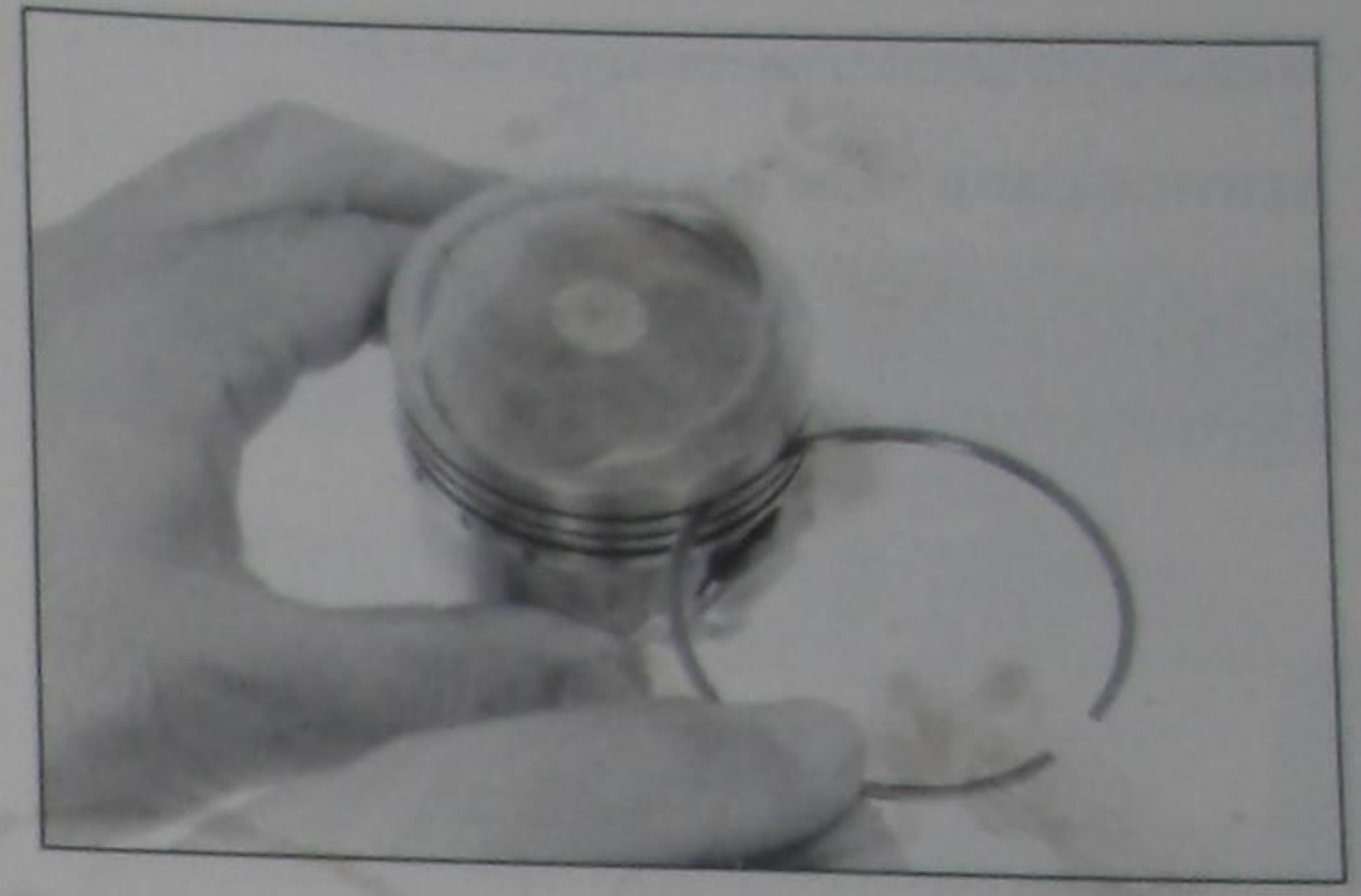
- **Do not damage the piston ring by spreading the ends too far.**



Clean carbon deposits from the piston.

**CAUTION**

- **Clean carbon deposits from the ring grooves with a ring that will be discarded. Never use a wire brush; it will scratch the groove.**

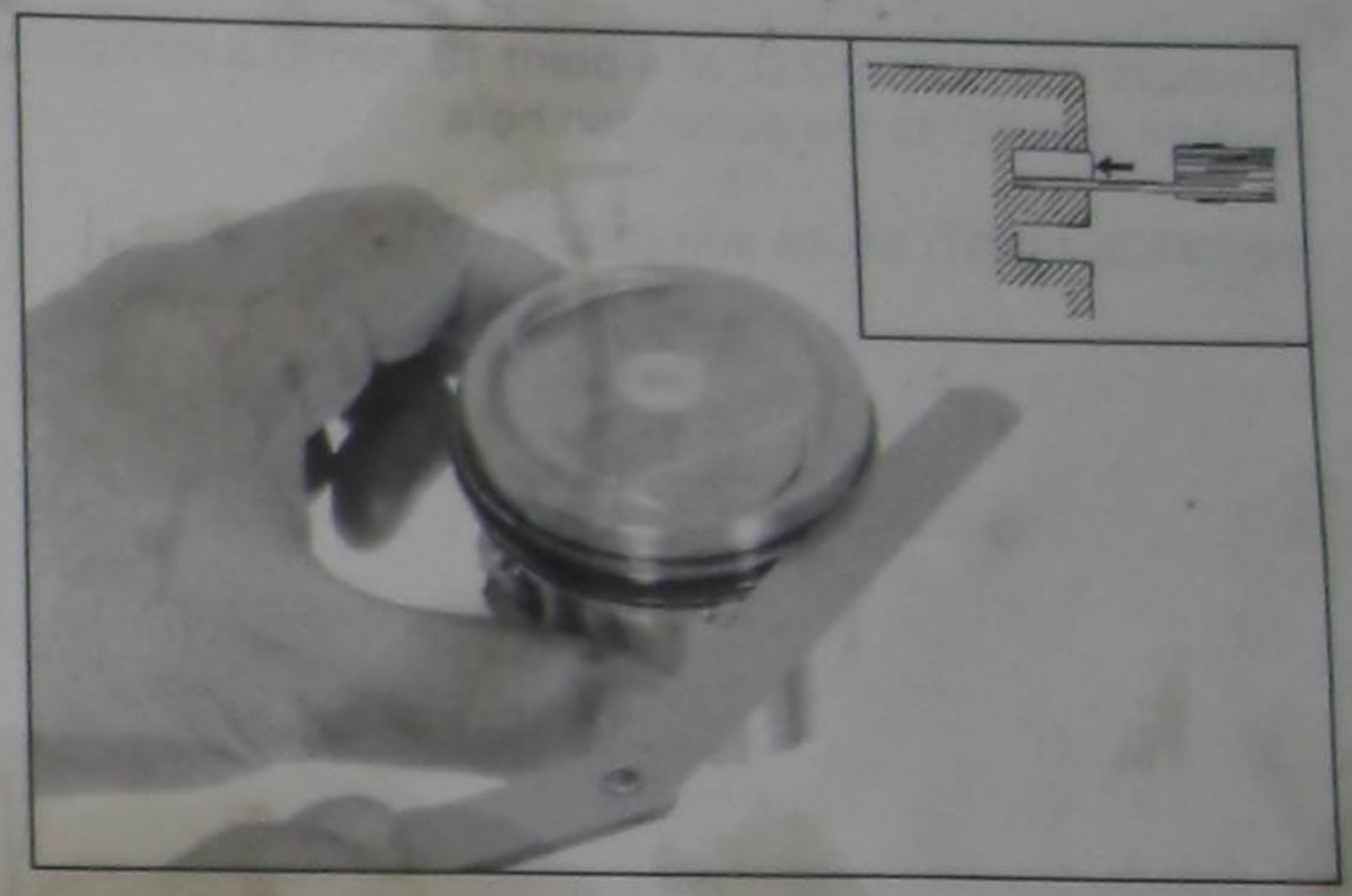


### PISTON INSPECTION

Inspect the piston rings for movement by rotating the rings. The rings should be able to move in their grooves without catching.

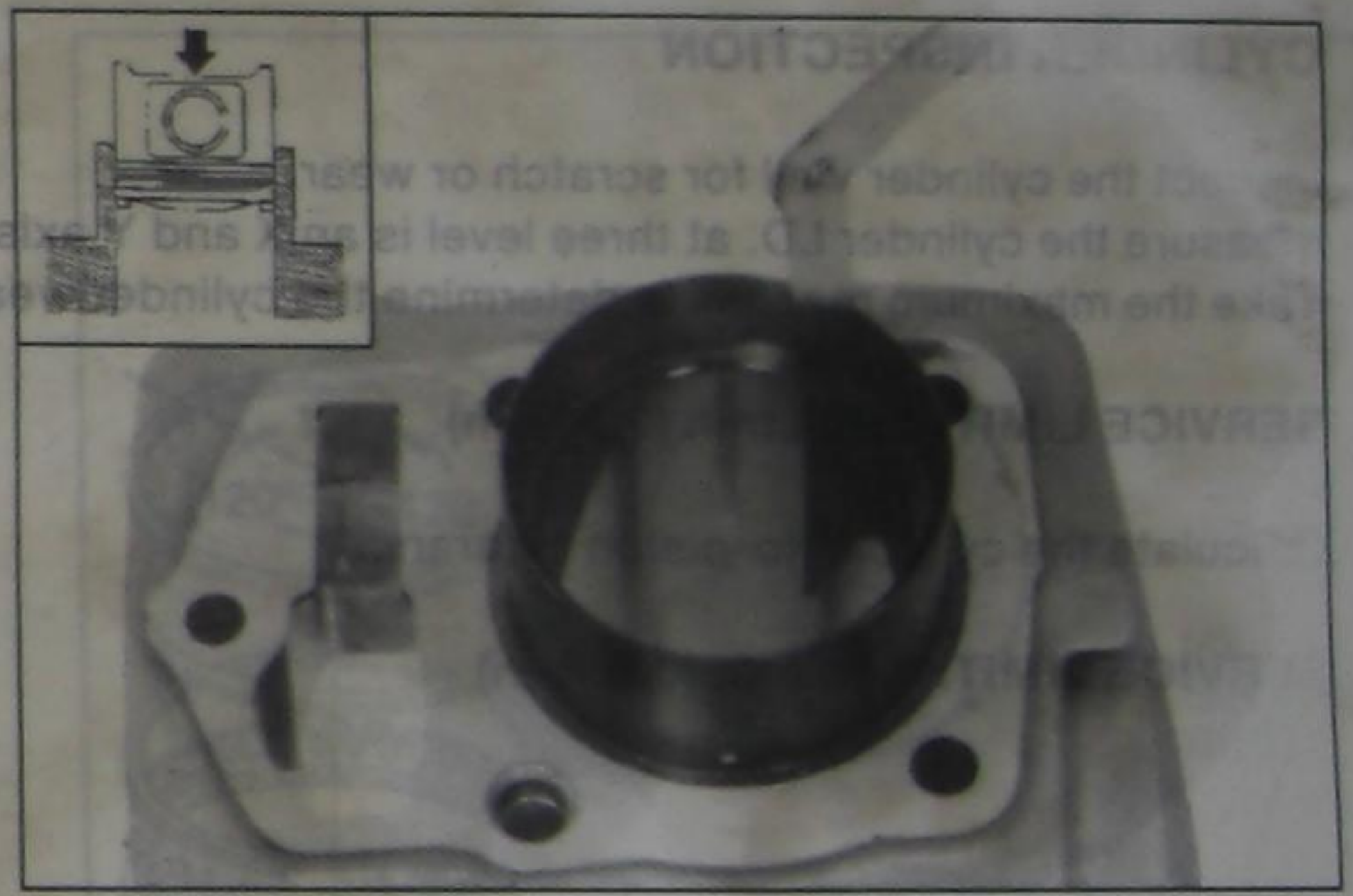
Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-to-ring groove clearance.

**SERVICE LIMITS: Top/Second: 0.10 mm (0.004 in)**



Insert each piston ring into the bottom of the cylinder squarely using the piston.
Measure the ring end gap.

**SERVICE LIMIT: Oil (side rail): 0.9 mm (0.04 in)**



Measure the piston pin O.D. at piston and connecting rod sliding areas.

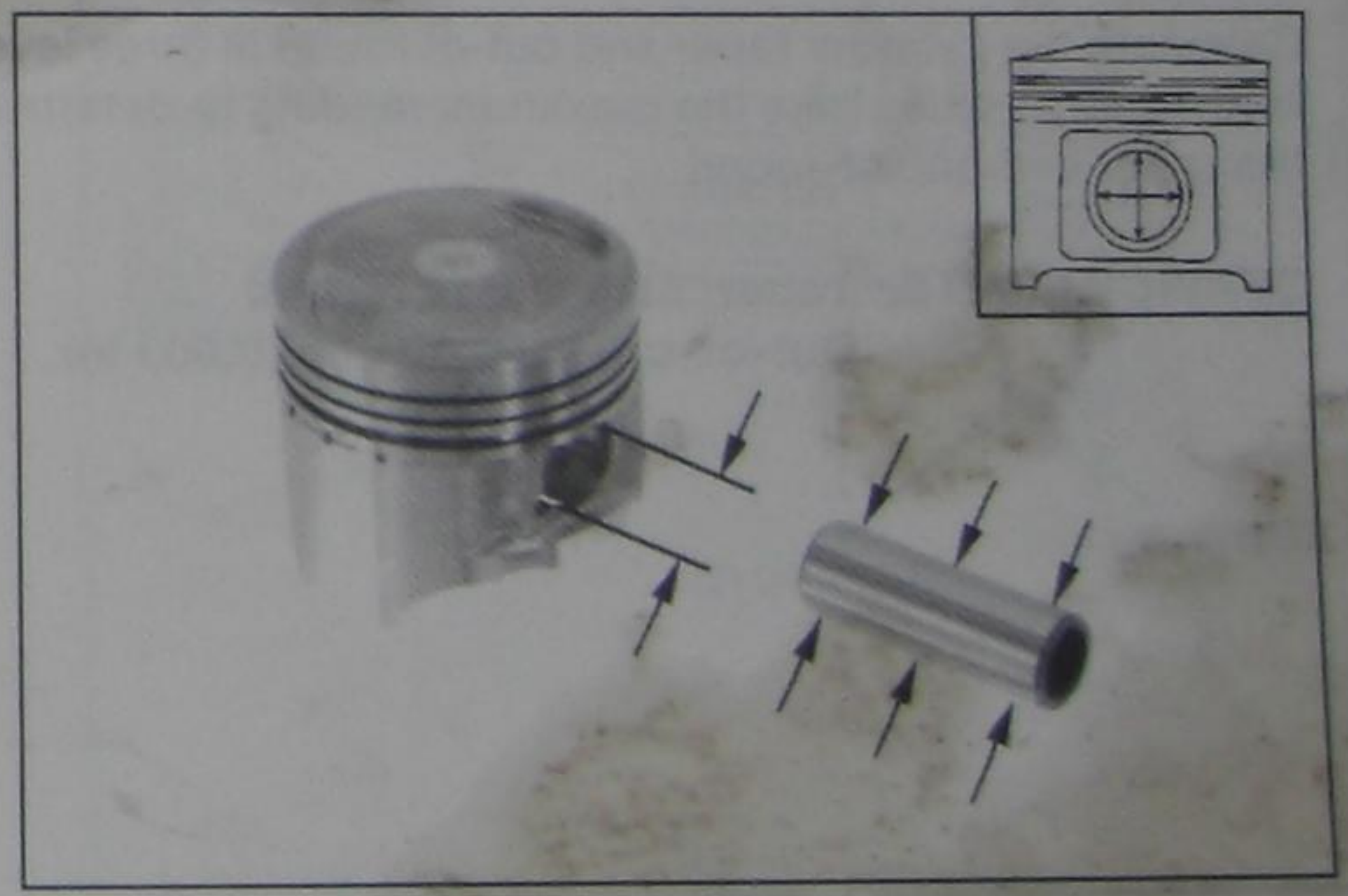
**SERVICE LIMIT: 14.96 mm (0.589 in)**

Measure the piston pin hole I.D.

**SERVICE LIMIT: 15.04 mm (0.592 in)**

Calculate the piston-to-piston pin clearance.

**SERVICE LIMIT: 0.07 mm (0.003 in)**

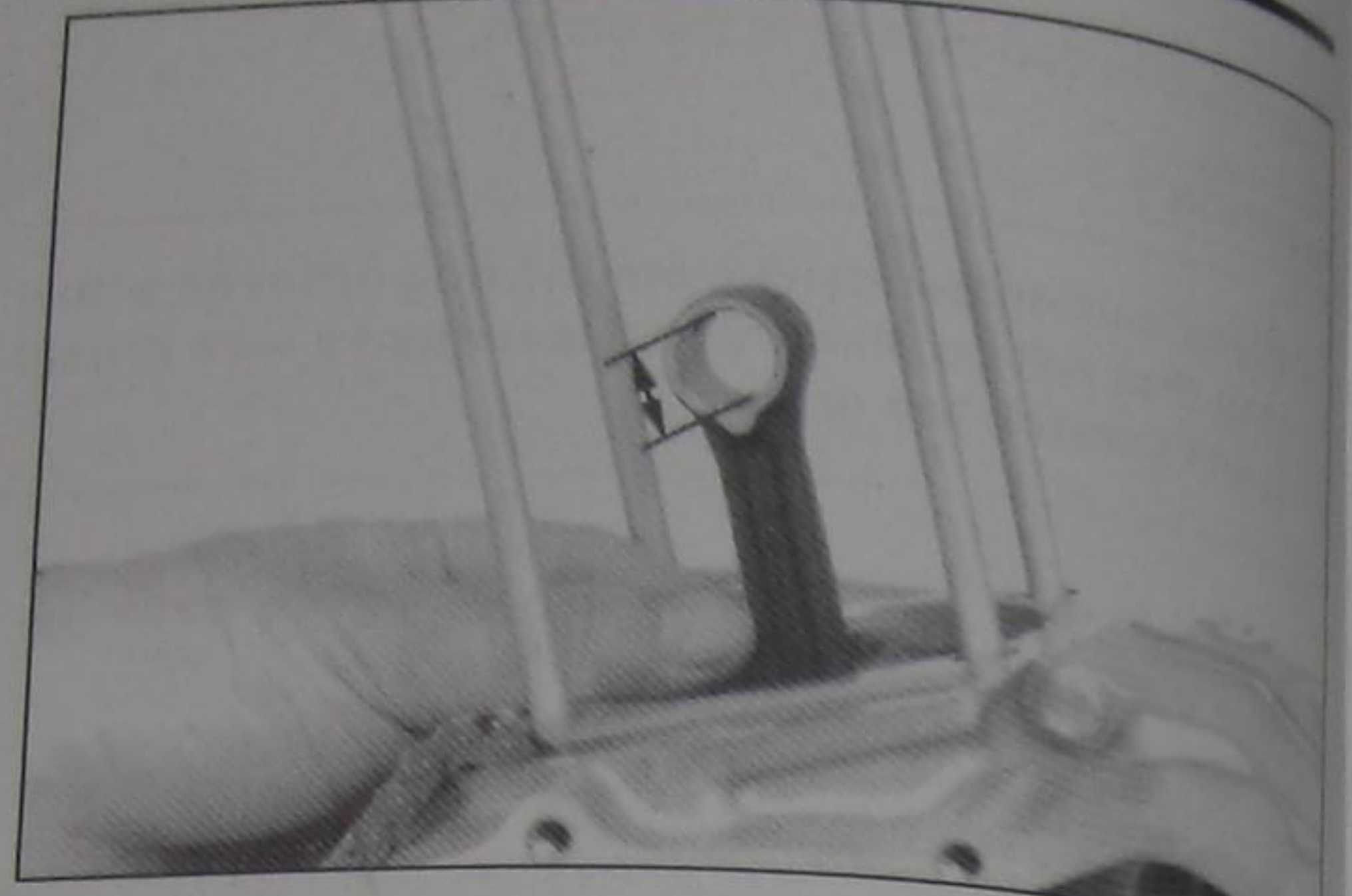


Measure the connecting rod small end I.D.

**SERVICE LIMIT: 15.06 mm (0.593 in)**

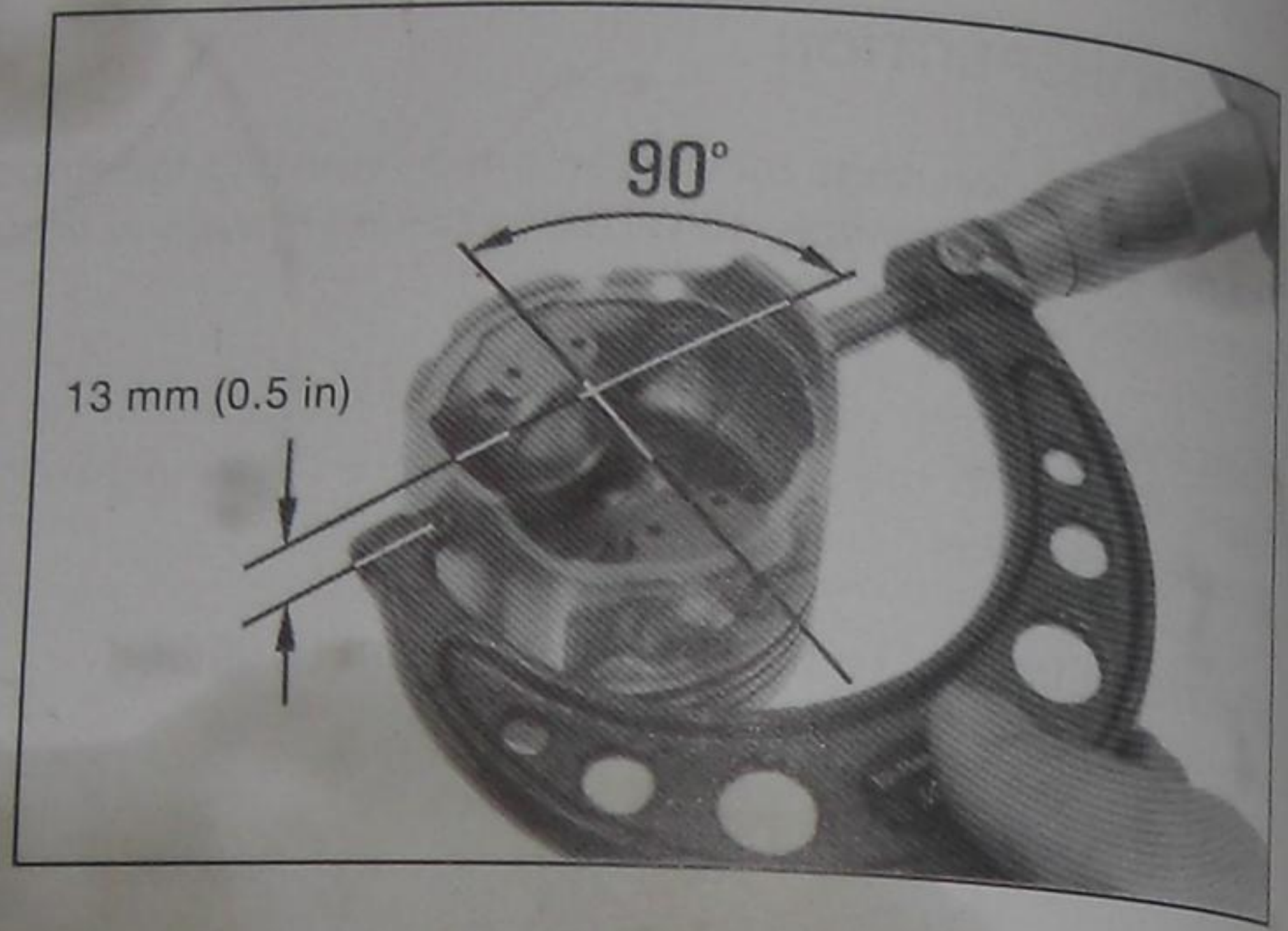
Calculate the connecting rod-to-piston pin clearance.

**SERVICE LIMIT: 0.10 mm (0.004 in)**



Measure the piston O.D. at a point 13 mm (0.5 in) from the bottom and 90° to the piston pin hole.

**SERVICE LIMIT: 56.42 mm (2.221 in)**



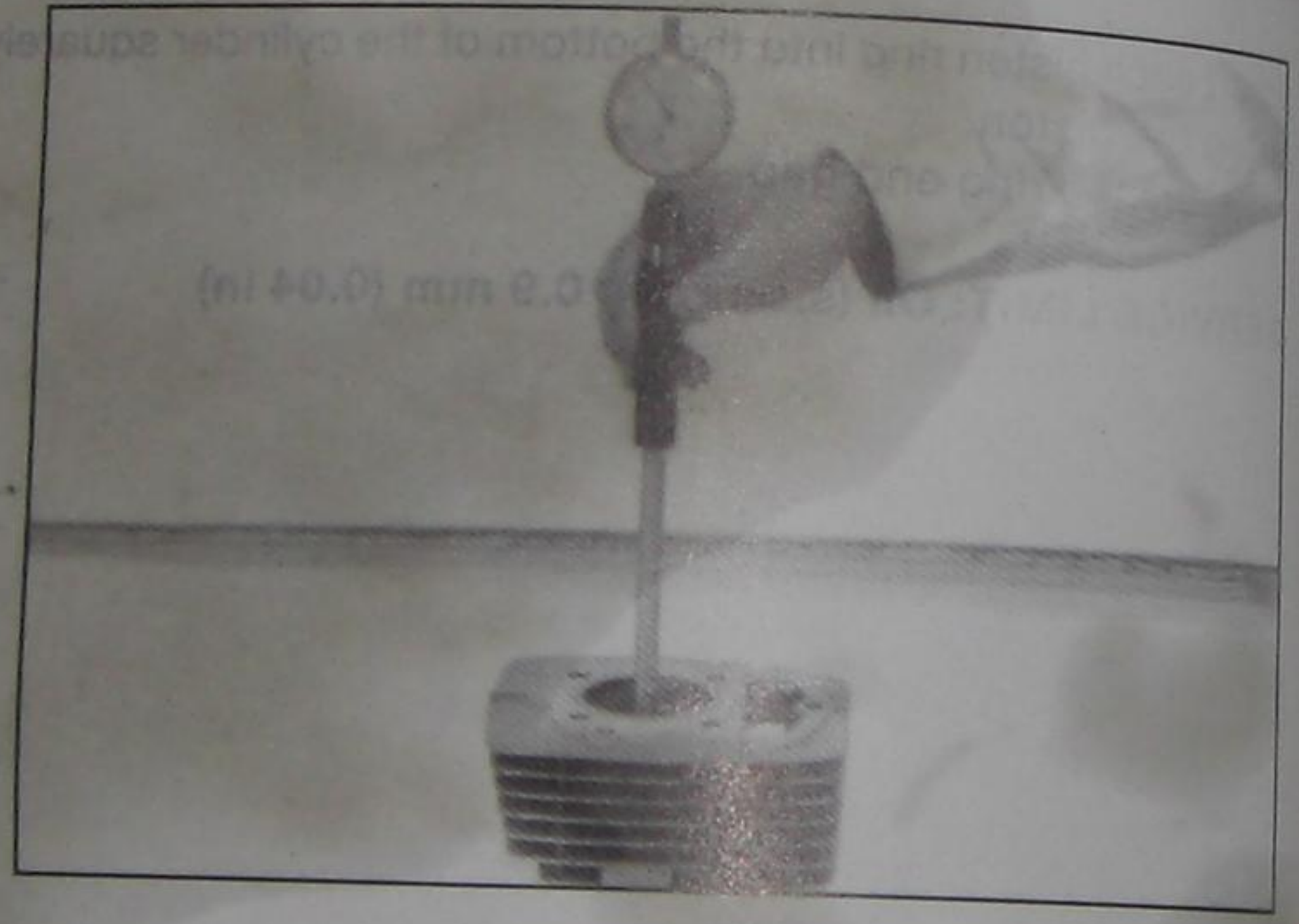
## CYLINDER INSPECTION

Inspect the cylinder wall for scratch or wear.
Measure the cylinder I.D. at three level is an X and Y axis.
Take the maximum reading to determine the cylinder wear.

**SERVICE LIMIT: 56.60 mm (2.228 in)**

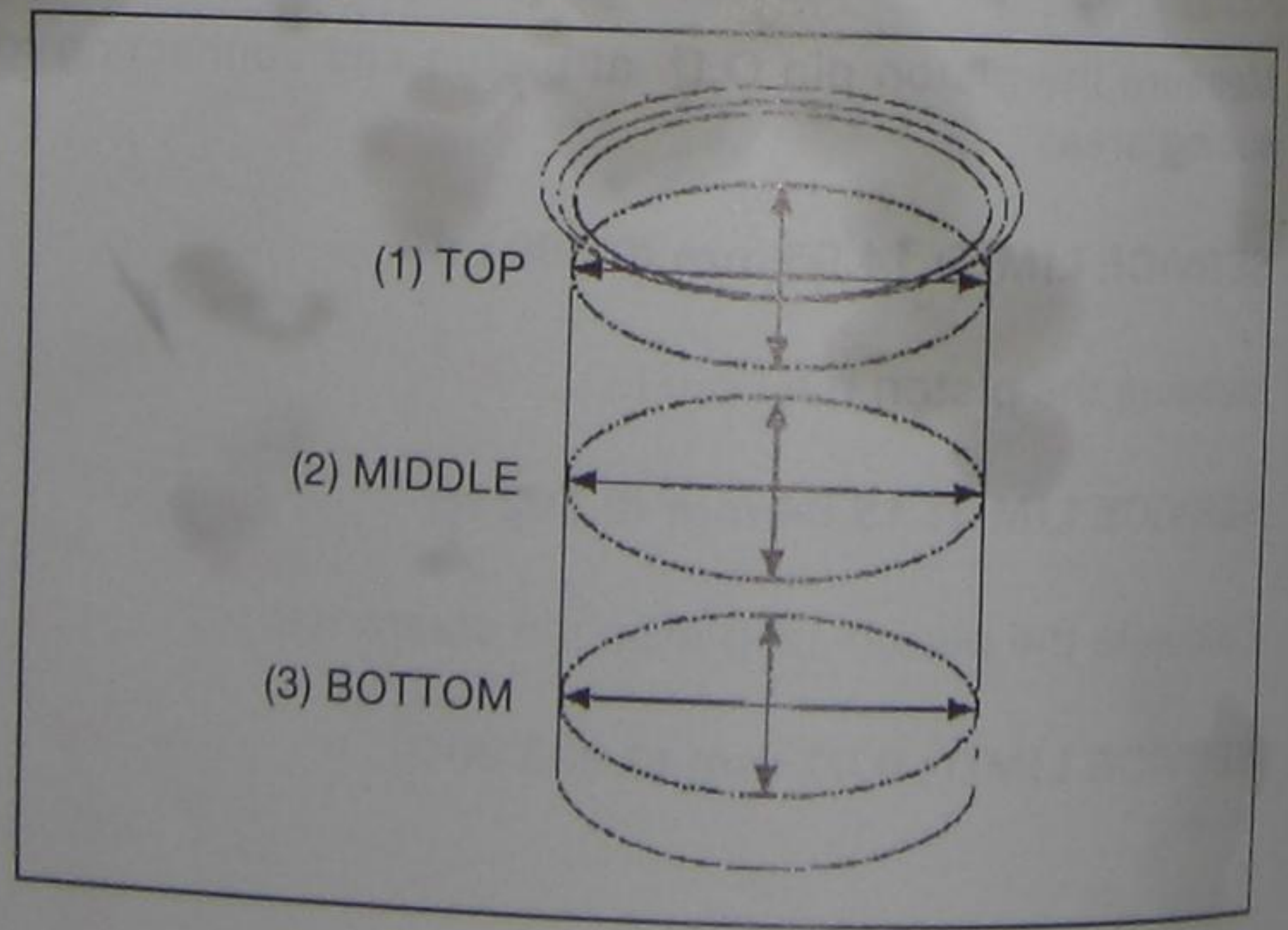
Calculate the cylinder-to-piston clearance.

**SERVICE LIMIT: 0.15 mm (0.006 in)**



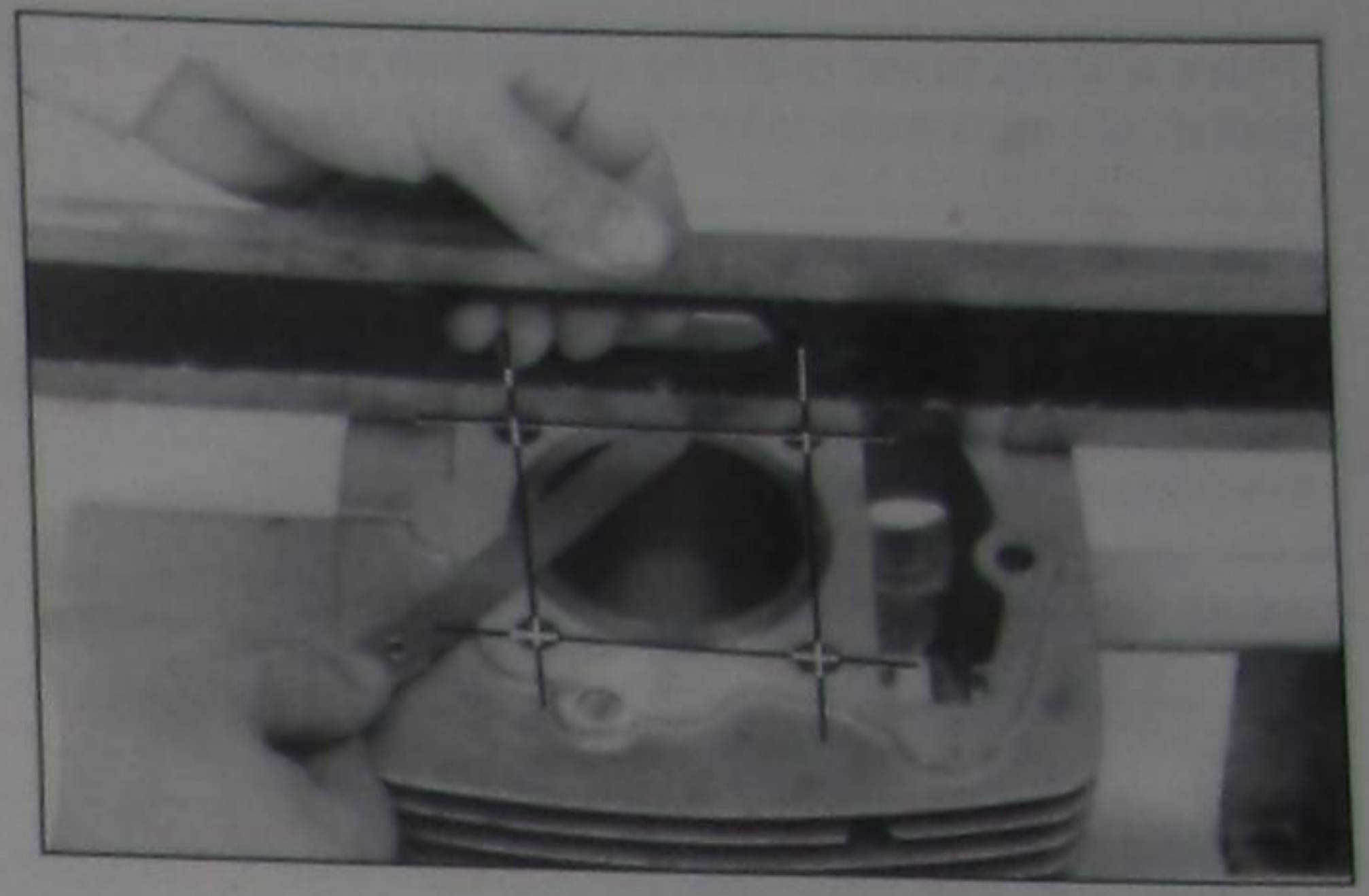
Calculate the cylinder taper and out-of round at three levels in an X and Y axis. Take the maximum reading to determine the taper and out-of-round.

**SERVICE LIMITS: Taper: 0.05 mm (0.002 in)**
**Out-of-round: 0.08 mm (0.003 in)**



Check the top of the cylinder for warpage with a straight edge and feeler gauge.

**SERVICE LIMIT: 0.05mm (0.002 in)**



## Cylinder/Piston Installation

Carefully install the piston rings into the piston ring grooves with the markings facing up.

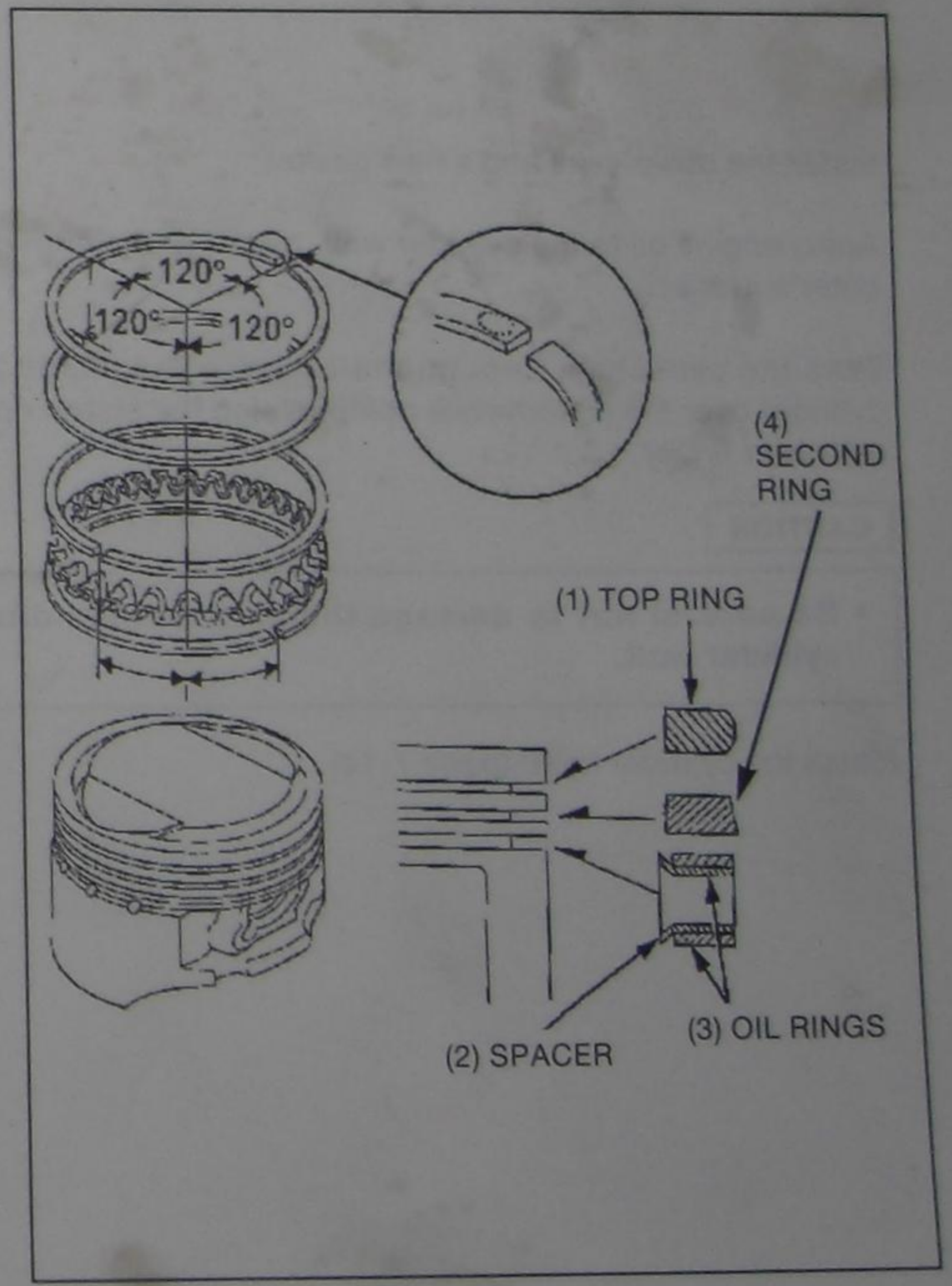
**CAUTION**

- **Be careful not to damage the piston and rings during installation.**

NOTE:

- To install the oil ring, install the spacer first, then install the side rails.

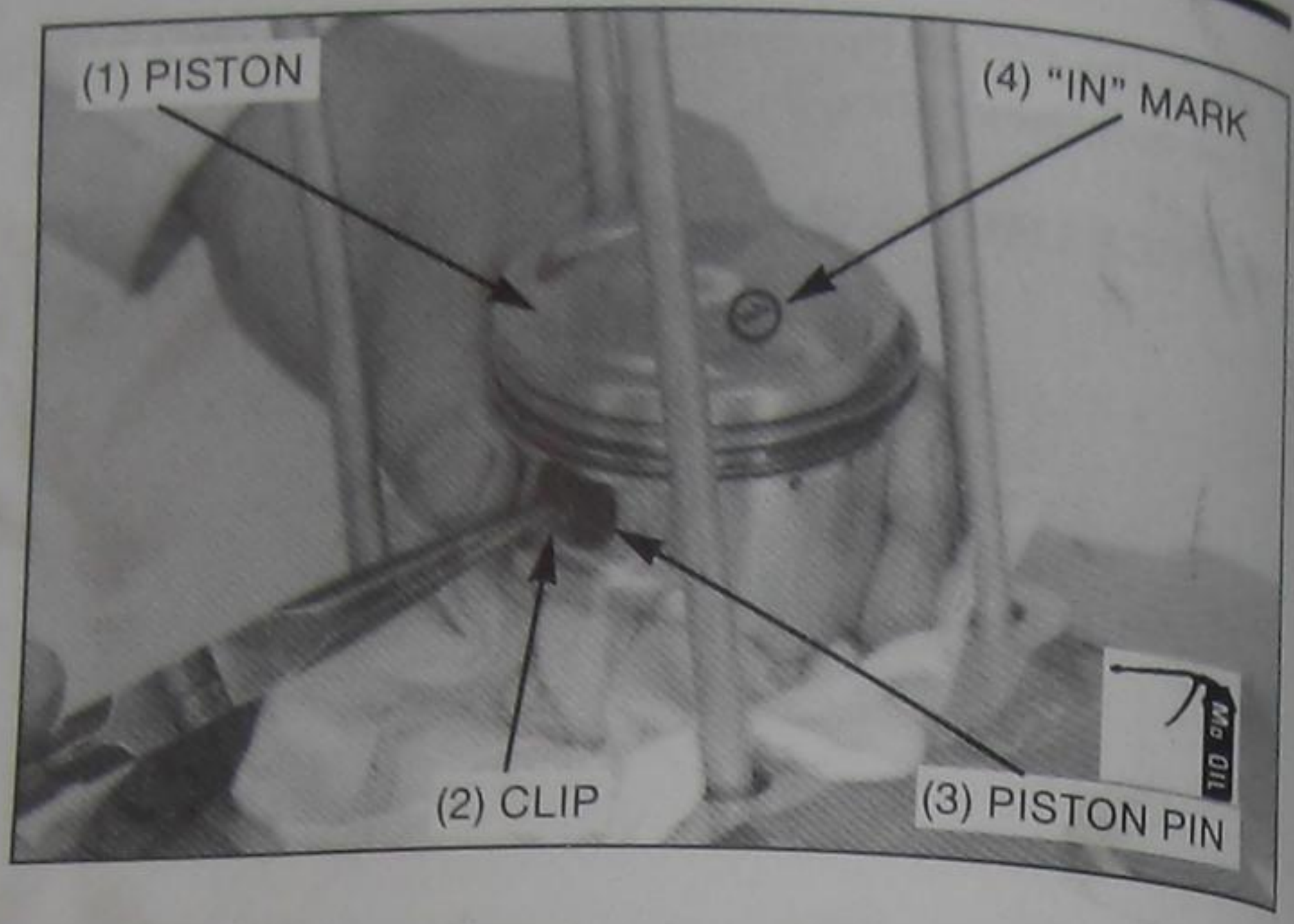
Stagger the piston ring end gaps 120 degrees apart from each other.
Stagger the side rail end gaps as shown.



Place a shop towel over the crankcase opening to prevent piston pin clips from falling into the crankcase.

Apply molybdenum oil solution to the piston pin outer surface.
Set the piston over the connecting rod with the "IN" mark facing toward the intake side and install the piston pin into the piston and connecting rod.

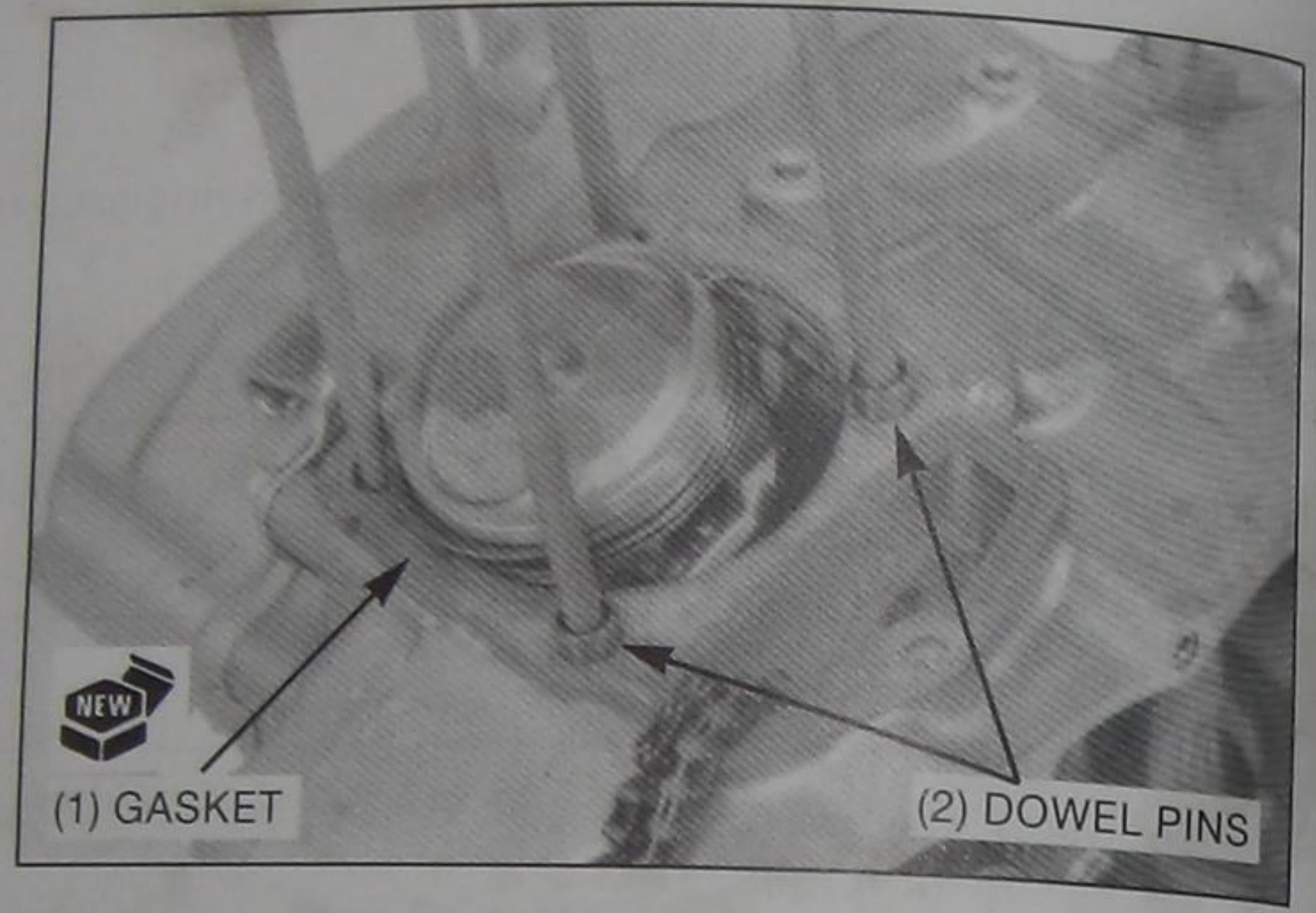
Install new piston pin clips into the grooves in the piston pin hole.

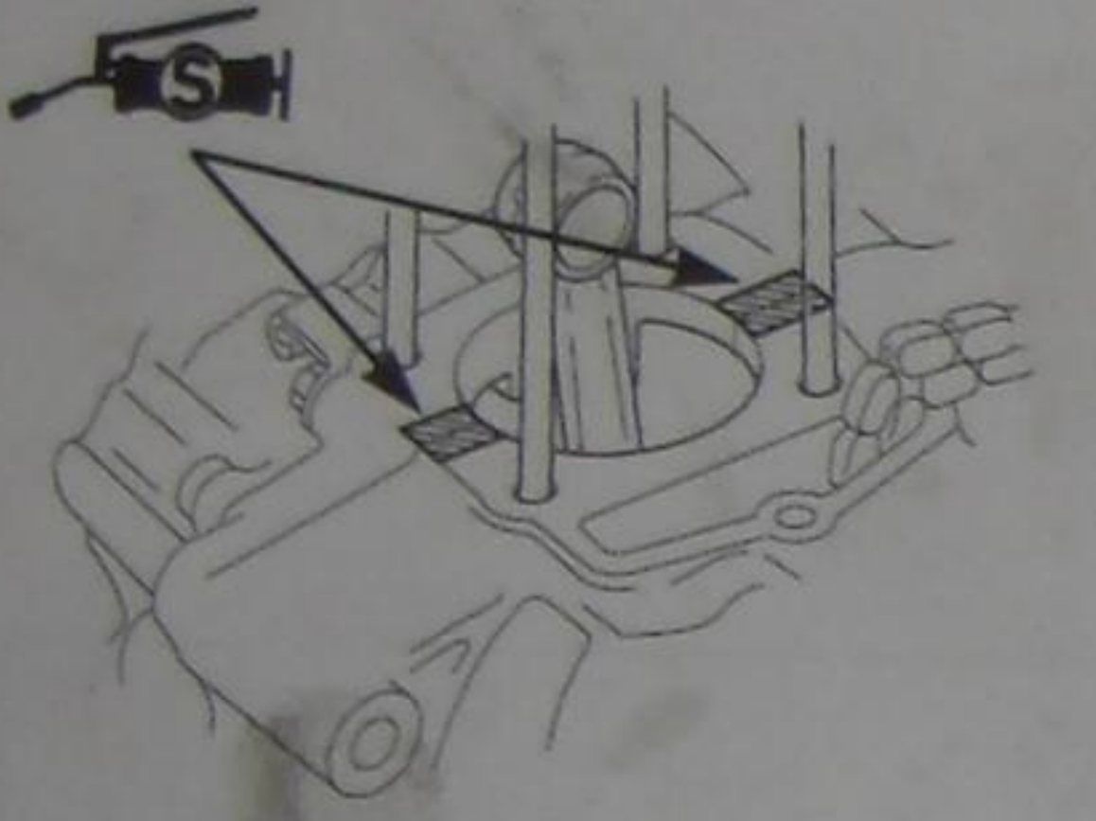


NOTE:

- Make sure that the piston pin clips are seated securely.
- Do not align the piston pin clip end gap with the piston cutout.

Clean the mating surface of the crankcase thoroughly, being careful not to damage it and not to allow gasket material into the crankcase.
Apply sealant to the mating surface of the crankcase as shown.

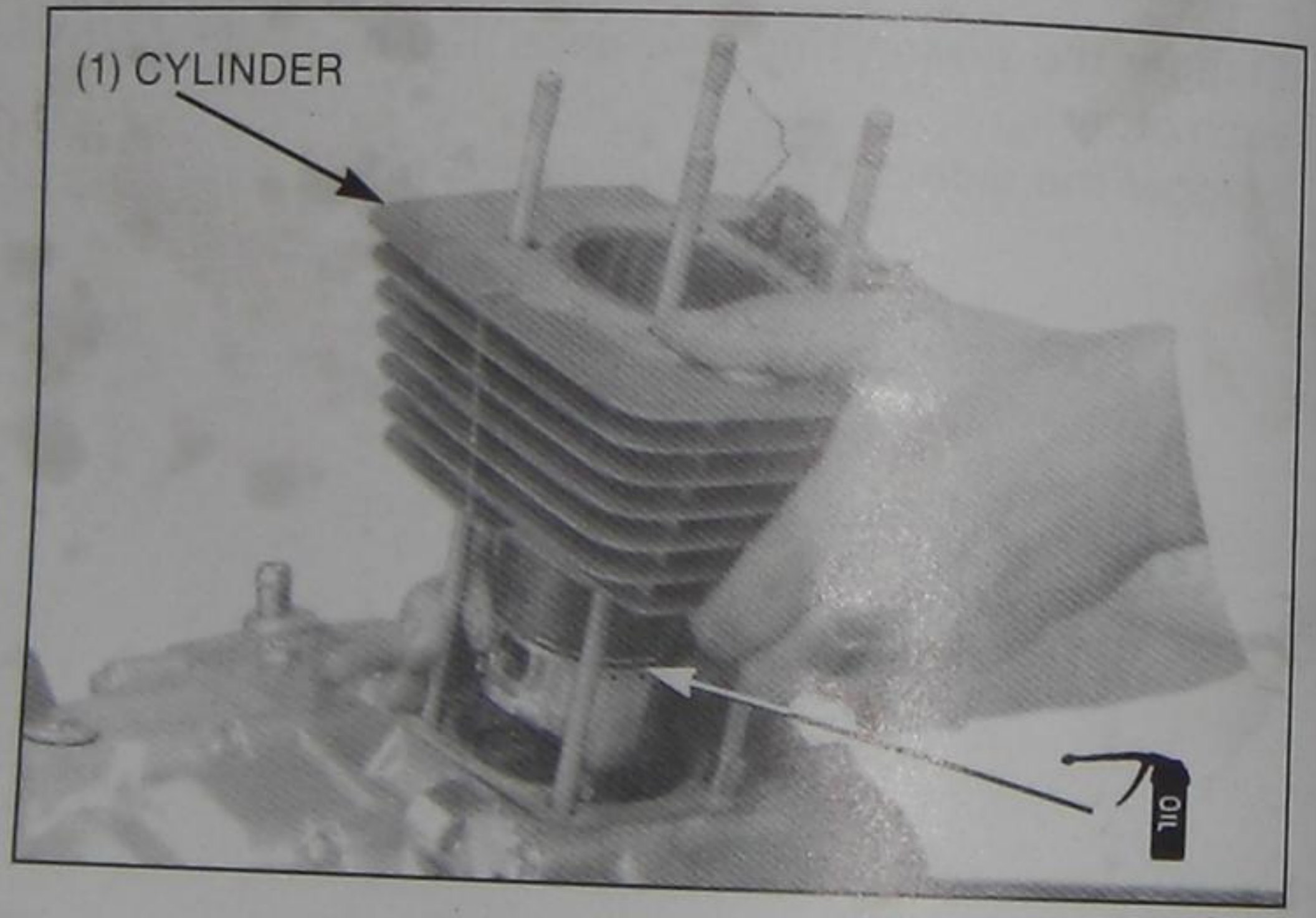




Install the dowel pins and a new gasket

Apply engine oil to the cylinder wall, piston and piston ring outer surfaces.

Pass the cam chain through the cylinder and install the cylinder over the piston while compressing the piston rings with your finger.



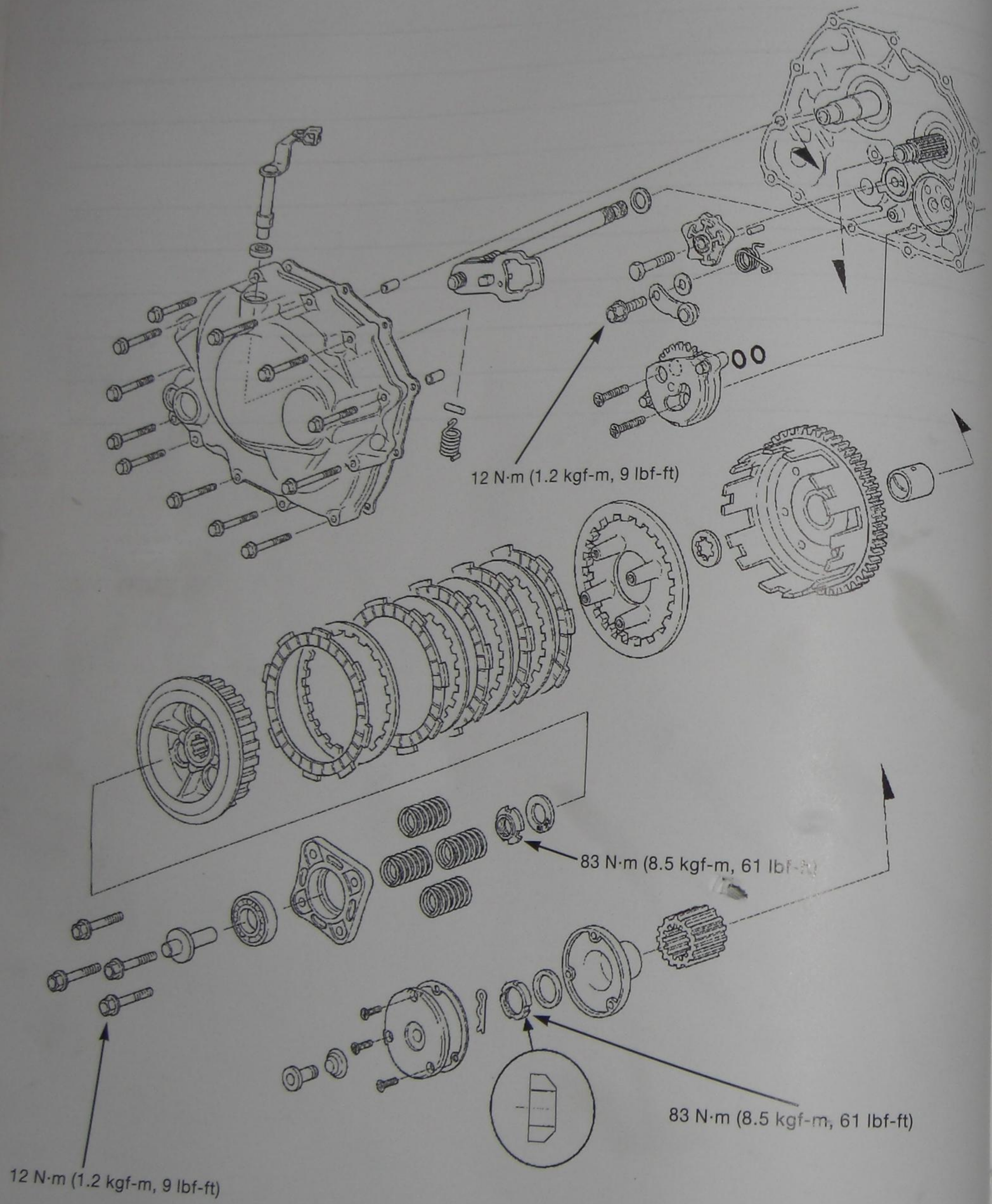
**CAUTION**

- **Be careful not to damage the piston rings and cylinder wall.**

Install the cylinder head (page 7-14)

---

## MEMO


12 N·m (1.2 kgf-m, 9 lbf-ft)
83 N·m (8.5 kgf-m, 61 lbf-ft)
83 N·m (8.5 kgf-m, 61 lbf-ft)
12 N·m (1.2 kgf-m, 9 lbf-ft)

# 9. Clutch/Gearshift Linkage

| | | | |
|---|---|---|---|
| SERVICE INFORMATION | 9-1 | CLUTCH | 9-3 |
| TROUBLESHOOTING | 9-2 | GEARSHIFT LINKAGE | 9-10 |
| RIGHT CRANKCASE COVER REMOVAL | 9-3 | RIGHT CRANKCASE COVER INSTALLATION | 9-12 |

## Service Information

### GENERAL

- The clutch and gearshift linkage can be serviced with the engine installed in the frame.
- Engine oil viscosity and level have and effect on clutch operation. When the clutch does not disengage or the motorcycle creeps with the clutch disengaged, inspect the engine oil and oil level before servicing the clutch system.
- The crankcase must be separated when the transmission, shift drum and shift forks require service (section 11).

### SPECIFICATIONS

Unit: mm (in)

| Item | | | Standard | Service Limit |
|---|---|---|---|---|
| Clutch | Lever free play | | 10-20 (3/8-3/4) | — |
| | Spring free length | | 34.7 (1.37) | 31.7 (1.25) |
| | Disc thickness | | 2.90-3.00 (0.114-0.118) | 2.6 (0.10) |
| | Plate warpage | | — | 0.20 (0.008) |
| | Outer I.D. | | 28.000-28.021 (1.1024-1.1032) | 28.04 (1.104) |
| | Outer guide | O.D. | 27.959-27.980 (1.1007-1.1015) | 27.93 (1.100) |
| | | I.D. | 19.983-19.996 (0.7867-0.7872) | 20.02 (0.788) |
| Mainshaft O.D. at clutch outer guide. | | | 19.967-19.980 (0.7861-0.7866) | 19.92 (0.784) |

### TORQUE VALUES

| | | |
|---|---|---|
| Oil filter rotor lock nut | 83 N·m (8.5 kgf-m, 61 lbf-ft) | Apply oil to the threads and seating surface |
| Clutch center lock nut | 83 N·m (8.5 kgf-m, 61 lbf-ft) | Apply oil to the threads and seating surface.<br>Stake. |
| Clutch lifter plate bolt | 12 N·m (1.2 kgf-m, 9 lbf-ft) | |
| Gearshift drum stopper arm bolt | 12 N·m (1.2 kgf-m, 9 lbf-ft) | |
| Gearshift pedal bolt | 12 N·m (1.2 kgf-m, 9 lbf-ft) | |

### TOOLS

| | |
|---|---|
| Driver | 07749-0010000 |
| Attachment, 32 x 35 mm | 07746-0010100 |
| Pilot, 17 mm | 07746-0040400 |
| Clutch center holder | 07GMB-KT70101 |
| Pin driver, 3 mm | 07744-0010200 |
| Lock nut wrench, 20 x 24 mm | 07716-0020100 |
| Gear holder | 07724-0010200 |

## Troubleshooting

**Clutch lever too hard**
- Damaged, kinked or dirty clutch cable
- Improperly routed clutch cable
- Damaged clutch lifter mechanism
- Faulty clutch lifter plate bearing

**Clutch will not disengage or motorcycle creeps with clutch disengaged**
- Too much clutch lever free play
- Warped clutch plates
- Faulty clutch lifter
- Oil lever too high, improper oil viscosity or oil additive used

**Clutch slips**
- No clutch lever free play
- Worn clutch discs
- Weak clutch springs
- Clutch lifter sticking
- Oil level too low or oil additive used

**Hard to shift**
- Incorrect clutch adjustment
- Bent or damaged gearshift spindle
- Damaged gearshift cam
- Bent fork shaft or damaged shift forks (section 11)

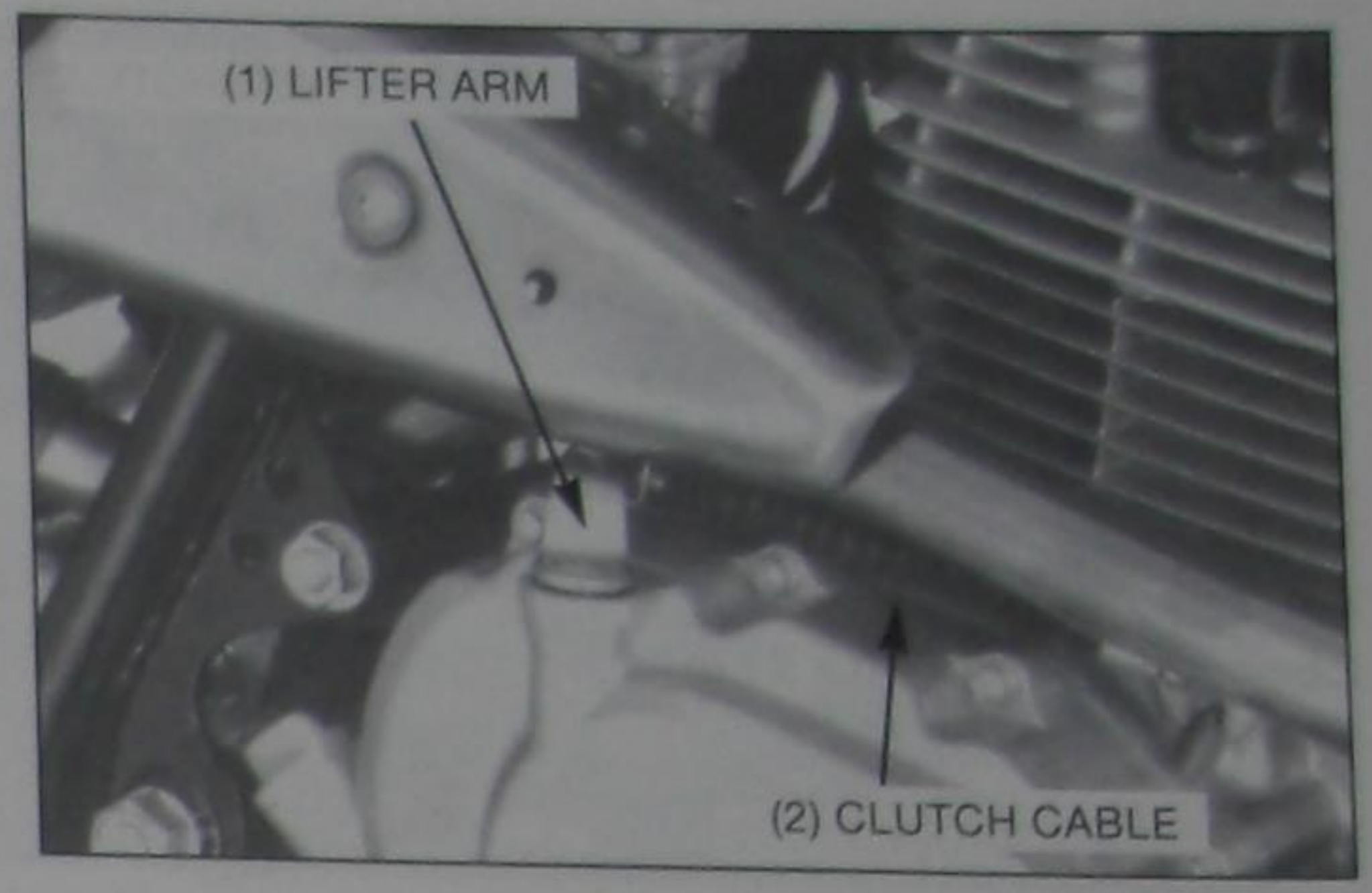
**Transmission jumps out of gear**
- Weak or broken shift linkage returns springs
- Broken shift drum stopper arm
- Worn or damaged gearshift cam
- Bent fork shaft or worn shift forks (section 11)
- Worn gear dogs or slots (section 11)

## Right Crankcase Cover Removal

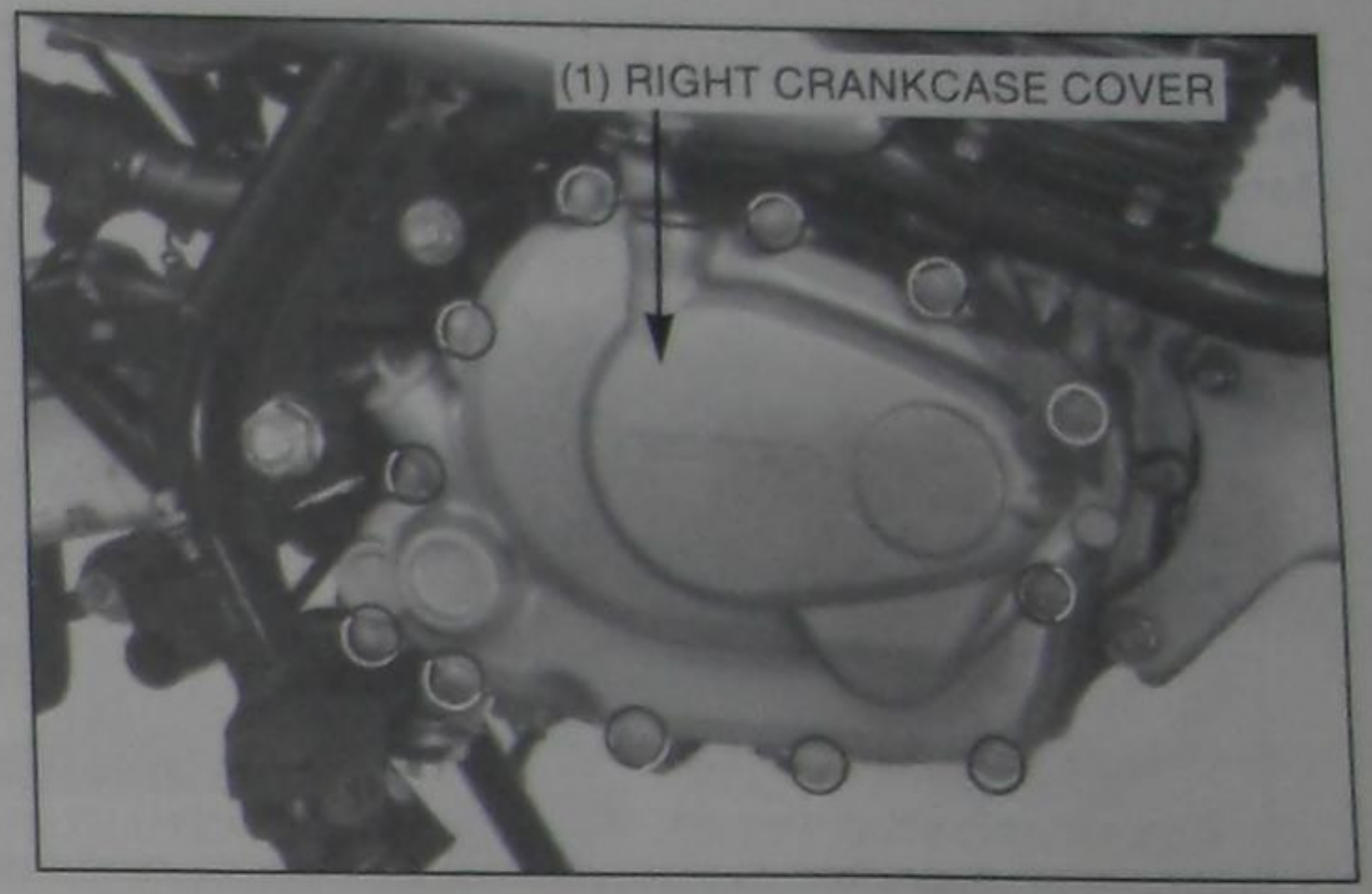
Remove the following:
- Brake pedal (page 13-10)
- Under guard (page 2-3).

Drain the engine oil (page 3-8).

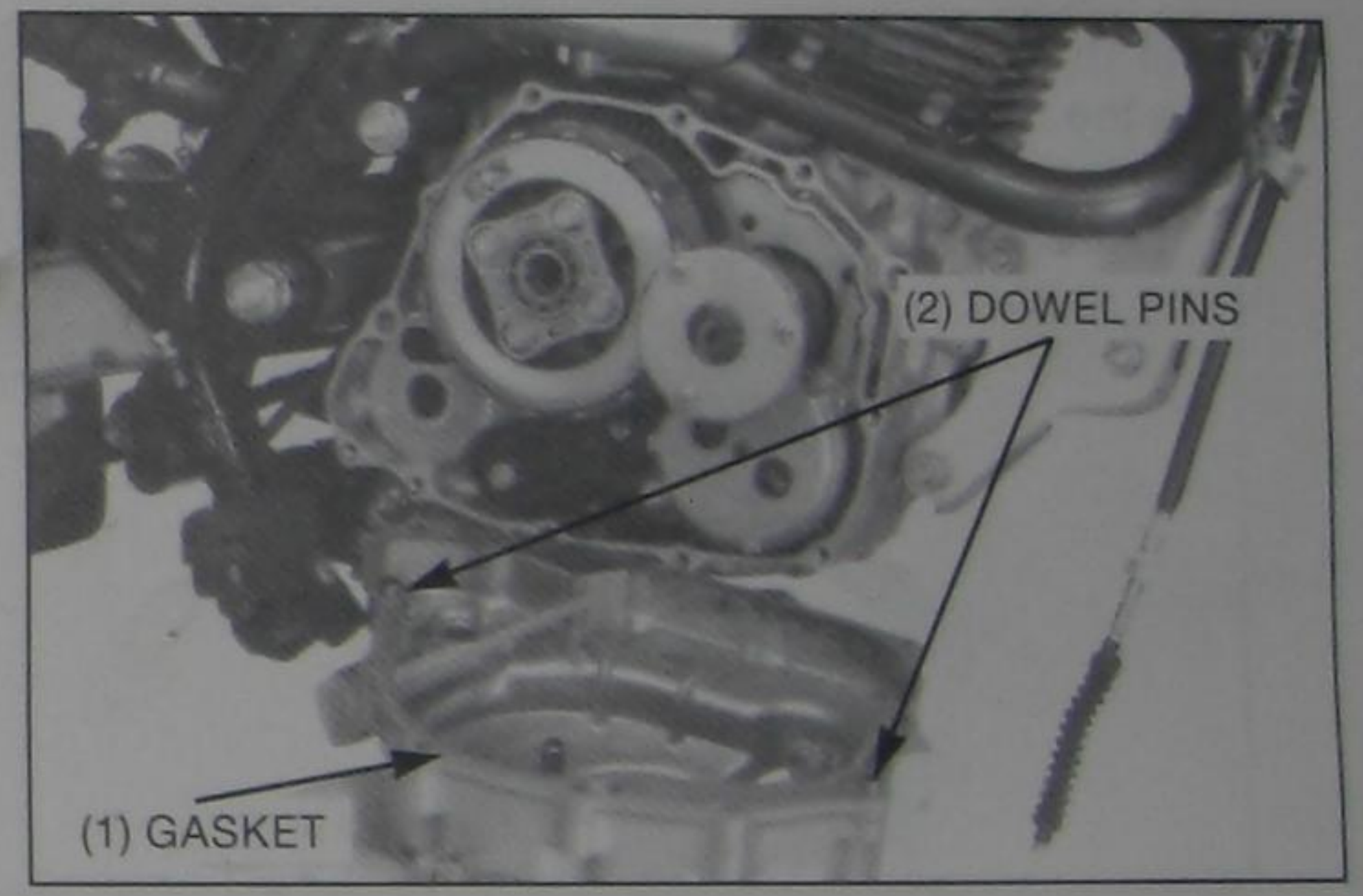
Loosen the clutch cable lock and adjusting nuts and disconnect the clutch cable from the clutch lifter arm.



Remove the twelve cover bolts.
Remove the right crankcase cover.



Remove the dowel pins and gasket.



## Clutch

### LIFTER ARM DISASSEMBLY

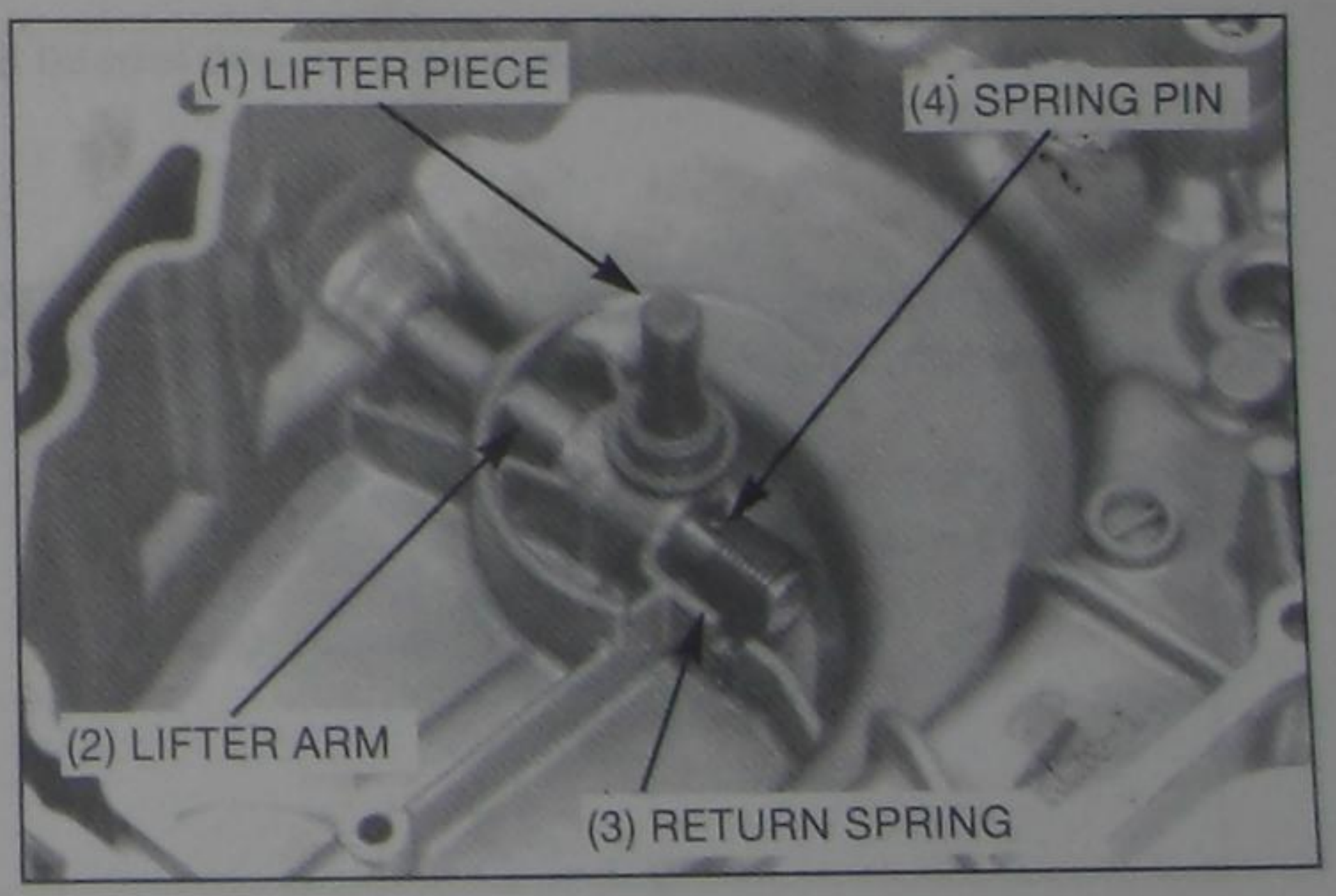
Remove the right cranckcase cover.

Remove the lifter piece by turing the lifter arm clockwise.

Record the projection of the spring pin.
Drive the spring pin into the lifter arm spindle until it is flush with the pin hole edge.

**TOOL:**
**Pin driver, 3 mm** **07744-0010200**

Remove the lifter arm and the spring.



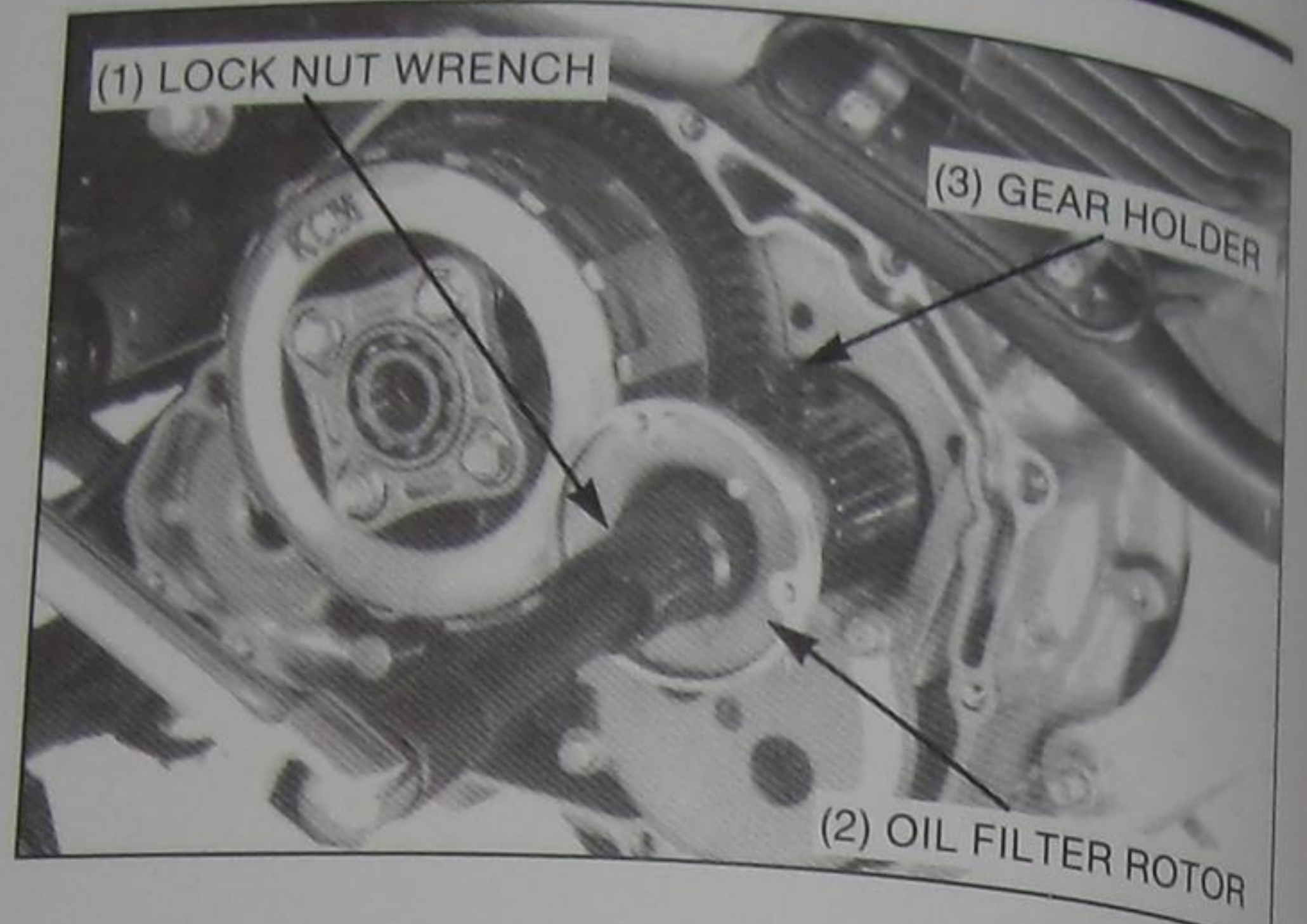
## CLUTCH DISASSEMBLY

Remove the oil filter rotor cover (page 4-2).

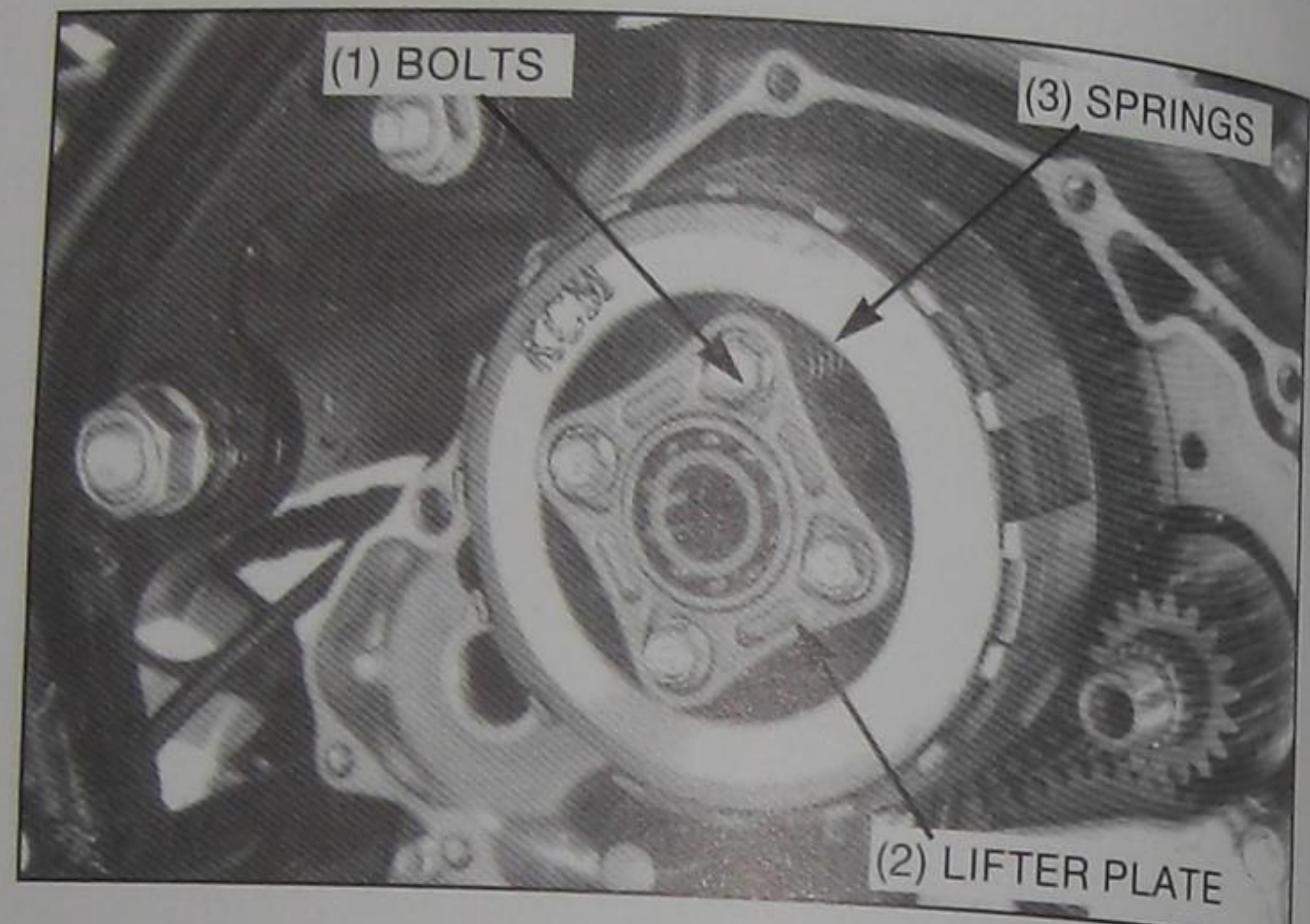
Install the special tool between the primary drive and driven gears as shown, loosen the oil filter rotor lock nut. Remove the lock nut, washer and oil filter rotor.

**TOOLS:**

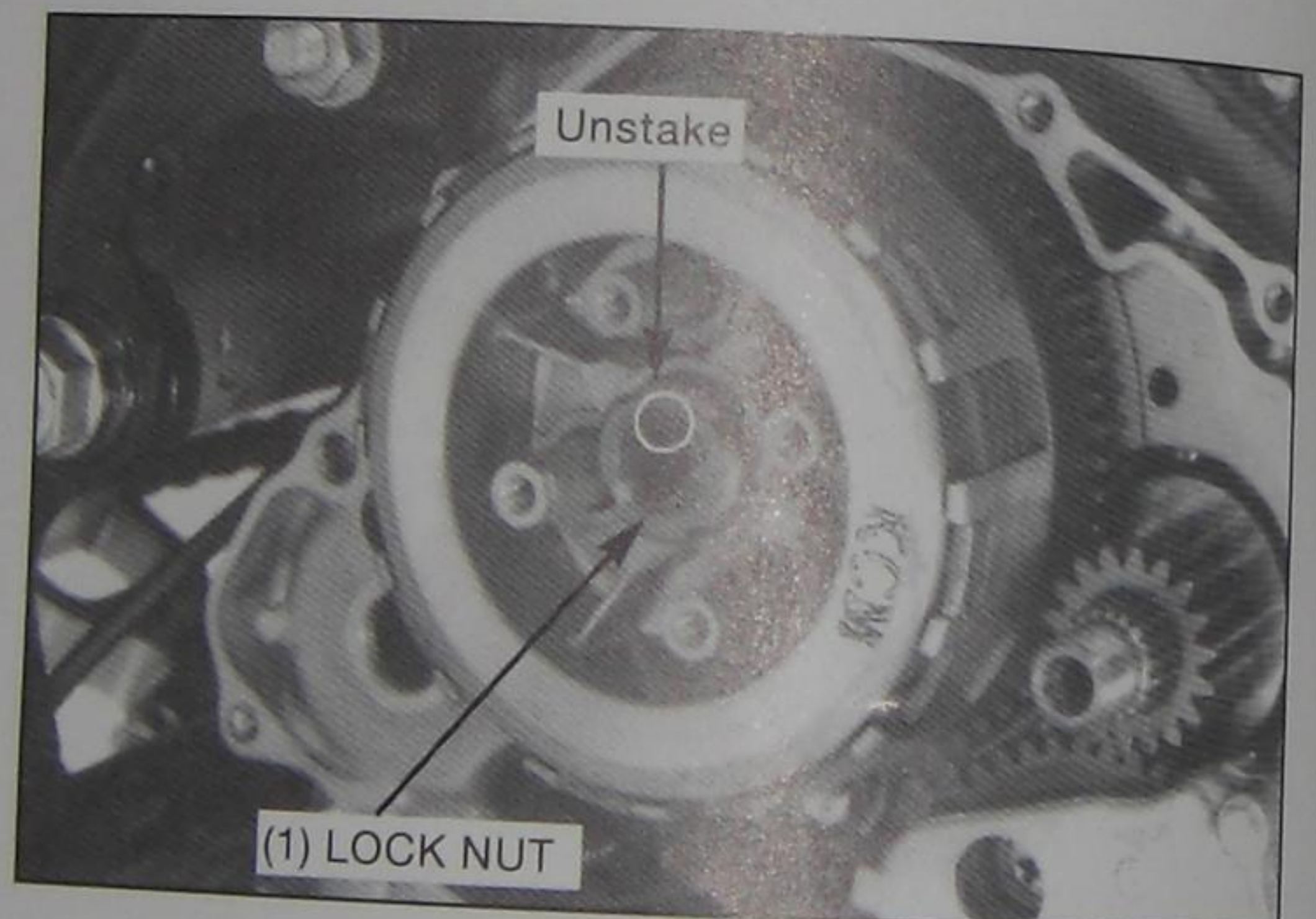
| | |
|---|---|
| **Gear holder:** | **07724-0010200** |
| **Lock nut wrench, 20 x 24 mm** | **07716-0020100** |


(1) LOCK NUT WRENCH
(3) GEAR HOLDER
(2) OIL FILTER ROTOR

Loosen the clutch lifter plate bolts in a crisscross pattern in several steps.
Remove the bolts, lifter plate and clutch springs.


(1) BOLTS
(3) SPRINGS
(2) LIFTER PLATE

Unstake the clutch center lock nut, being careful not to damage the mainshaft threads.

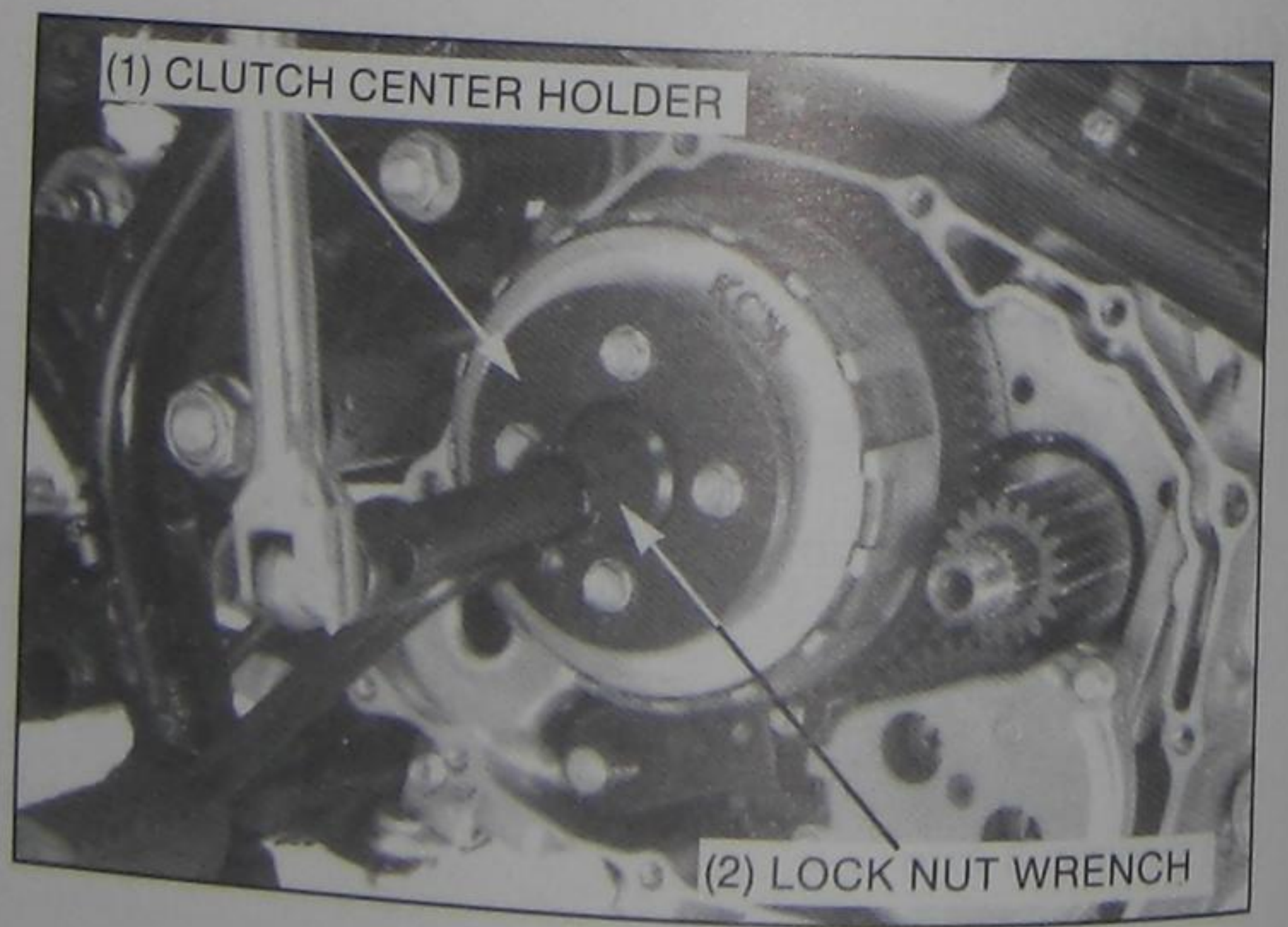

Unstake
(1) LOCK NUT

Hold the pressure plate with the special tool and loosen the clutch center lock nut.

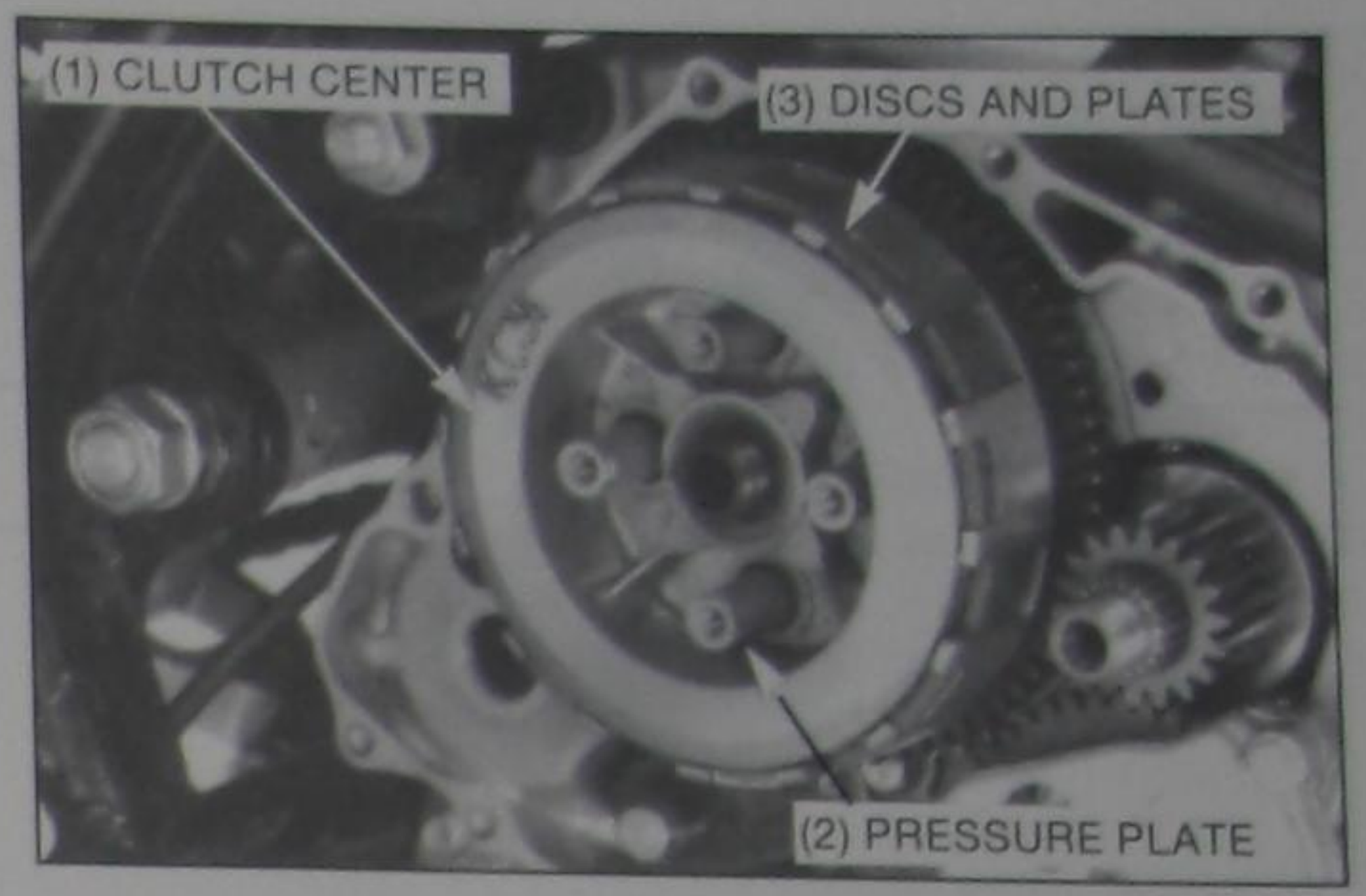
**TOOL:**

| | |
|---|---|
| **Clutch center holder** | **07GMB-KT70101** |
| **Lock nut wrench, 20 x 24 mm** | **07716-0020100** |

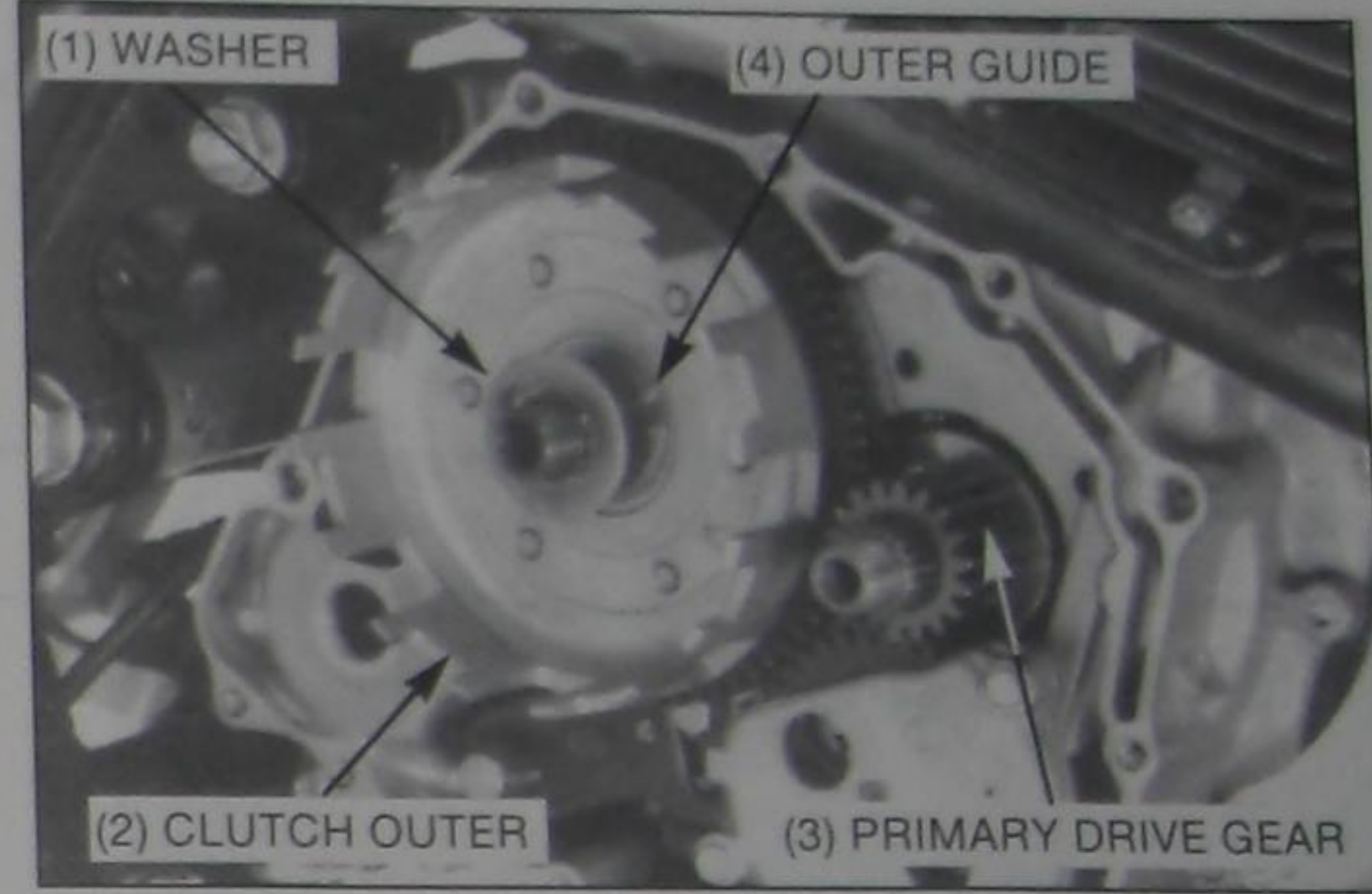
Remove the following:
- Lock nut and washer


(1) CLUTCH CENTER HOLDER
(2) LOCK NUT WRENCH

- Clutch center
- Clutch discs and plates
- Pressure plate


(1) CLUTCH CENTER
(3) DISCS AND PLATES
(2) PRESSURE PLATE

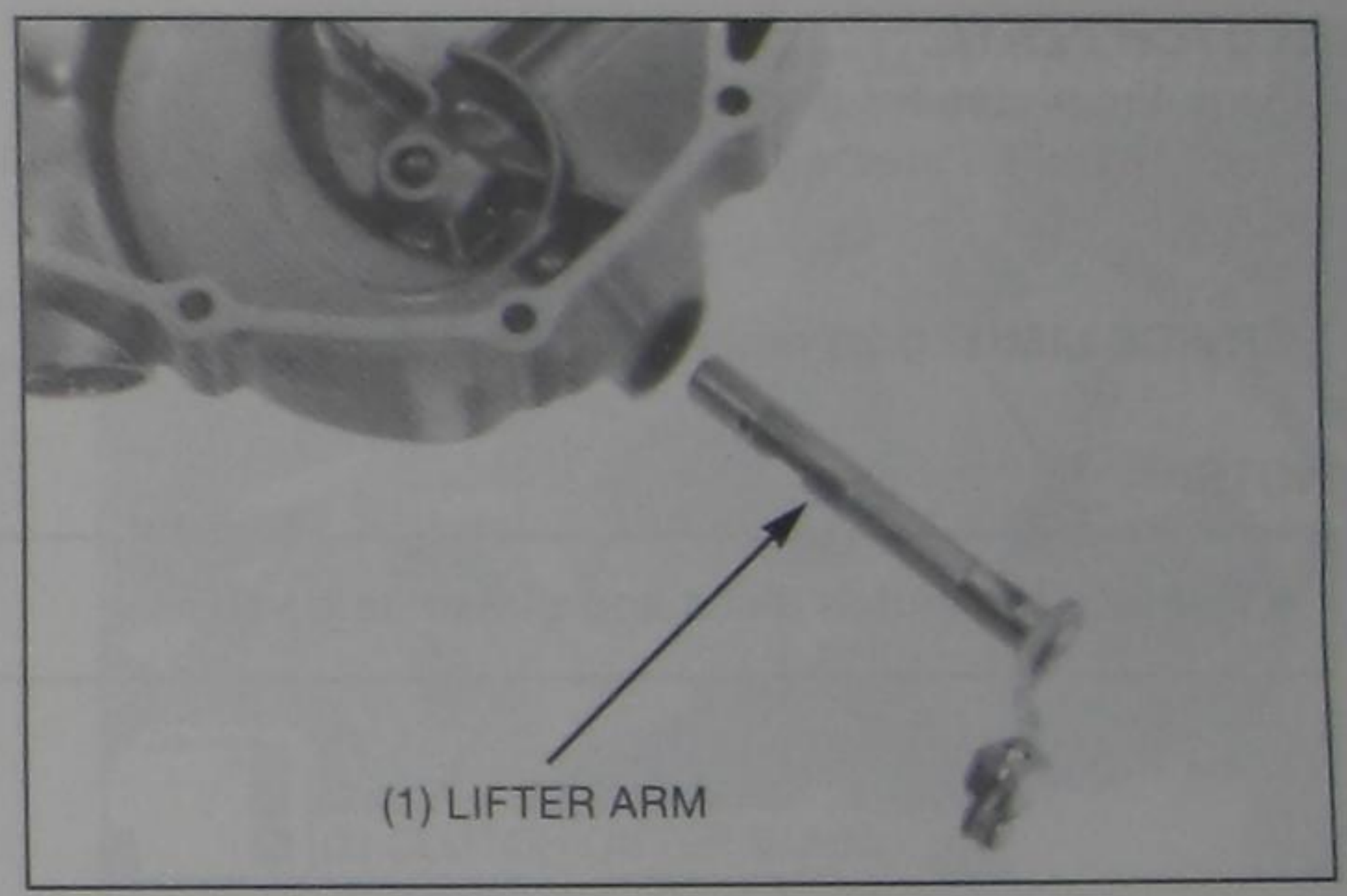
- Thrust washer (aligning spline teeth)
- Clutch outer
- Outer guide
- Primay drive gear


(1) WASHER
(4) OUTER GUIDE
(2) CLUTCH OUTER
(3) PRIMARY DRIVE GEAR

## INSPECTION

### LIFTER ARM

Check the lifter arm spindle and dust seal for wear or damage.
Check the return spring for fatigue or damage.


(1) LIFTER ARM

### LIFTER BEARING

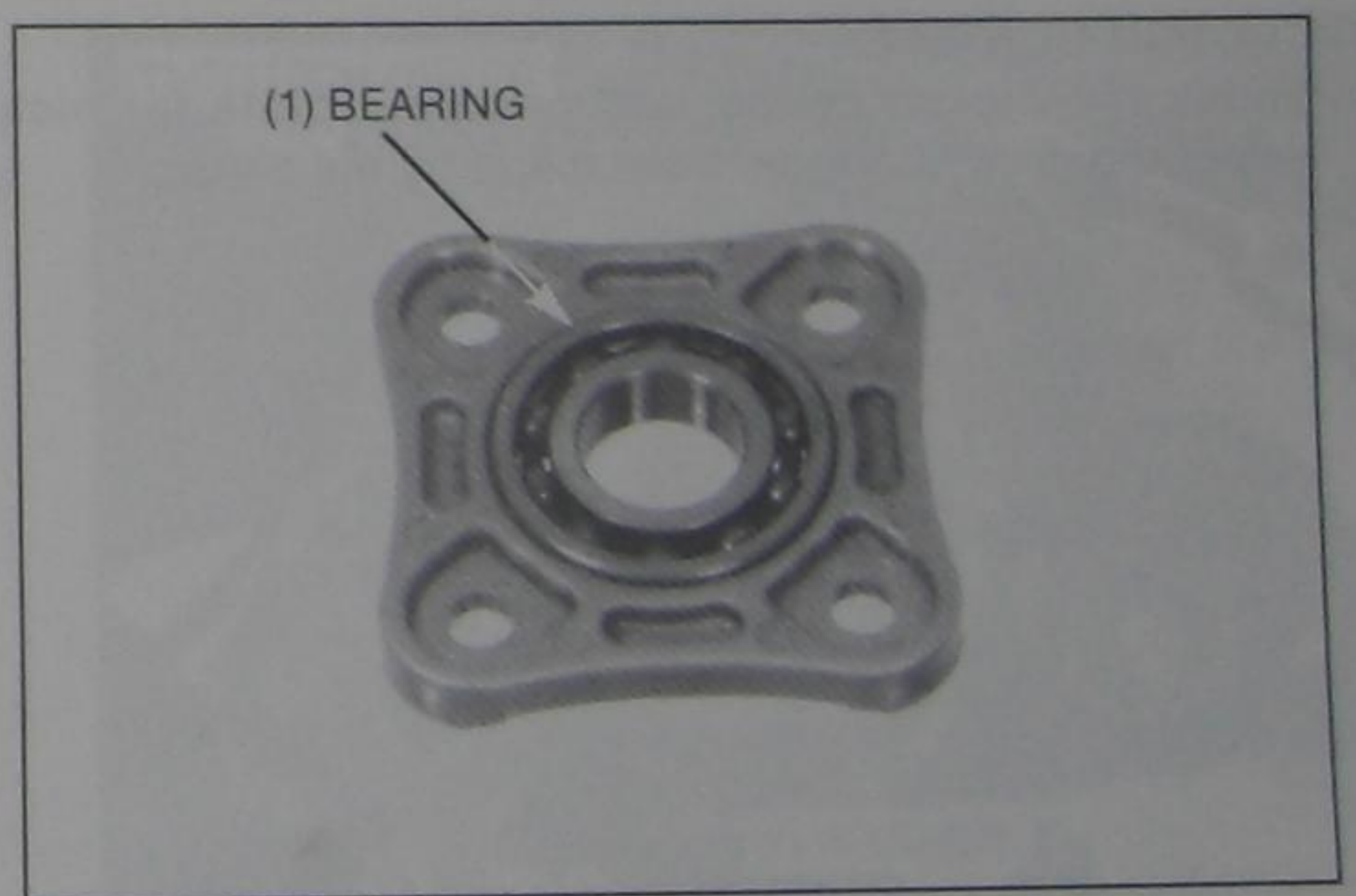
Turn the inner race of the lifter bearing with your finger.
The bearing should turn smoothly and quietly.
Also check that the outer race of the bearing fits tightly in the lifter plate.
Replace the bearing if the inner race does not turn smoothly, quietly, or if the outer race fit loosely in the lifter plate.

Drive the bearing out of the lifter plate.

Drive a new bearing into the plate with its mark side facing out.

**TOOLS:**

| | |
|---|---|
| **Driver** | **07749-0010000** |
| **Attachment, 32 x 35 mm** | **07746-0010100** |
| **Pilot, 17 mm** | **07746-0040400** |

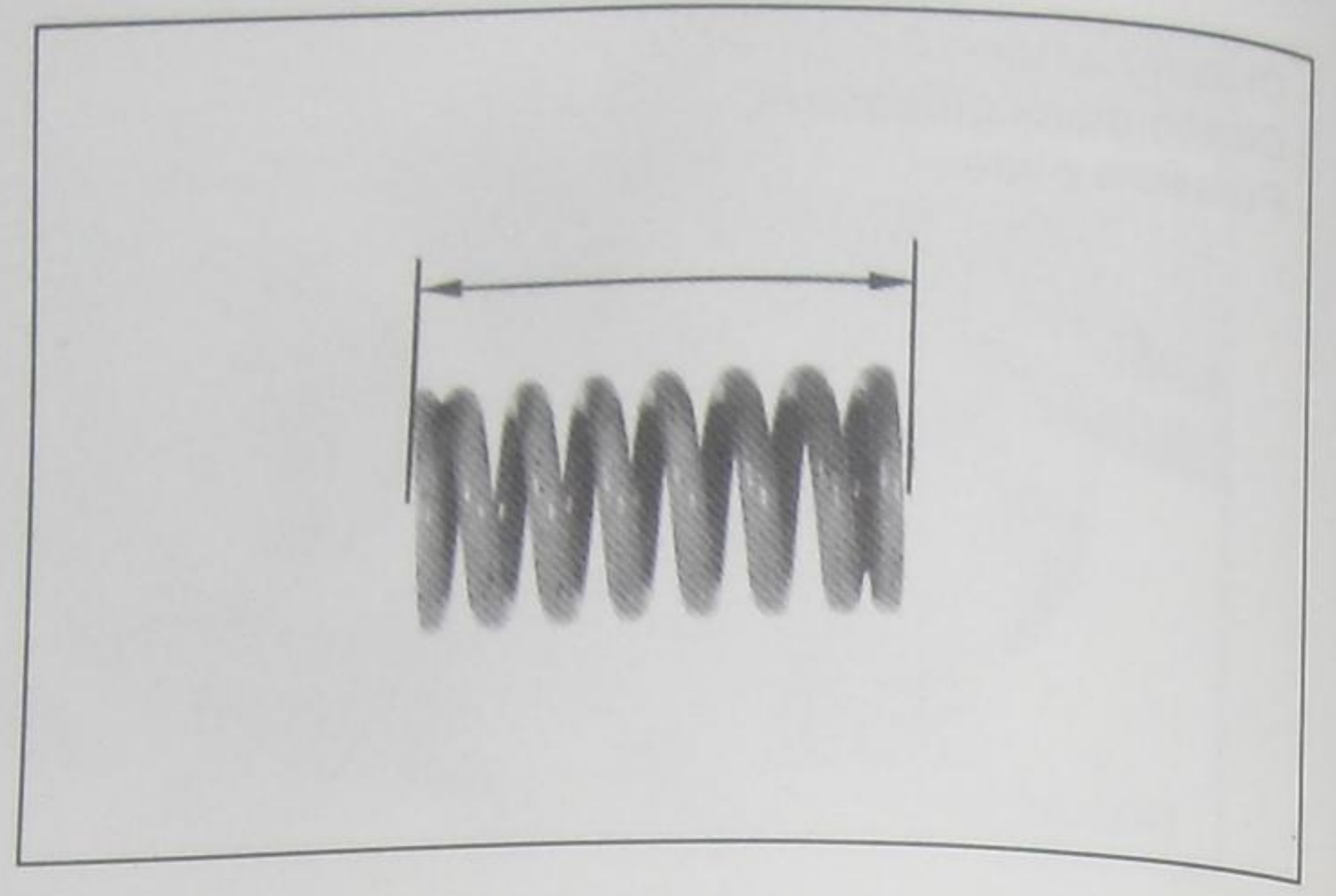


**CLUTCH SPRING**
Measure the clutch spring free length.

**SERVICE LIMIT: 31.7 mm (1.25 in)**

NOTE:

- Replace the clutch springs as a set.

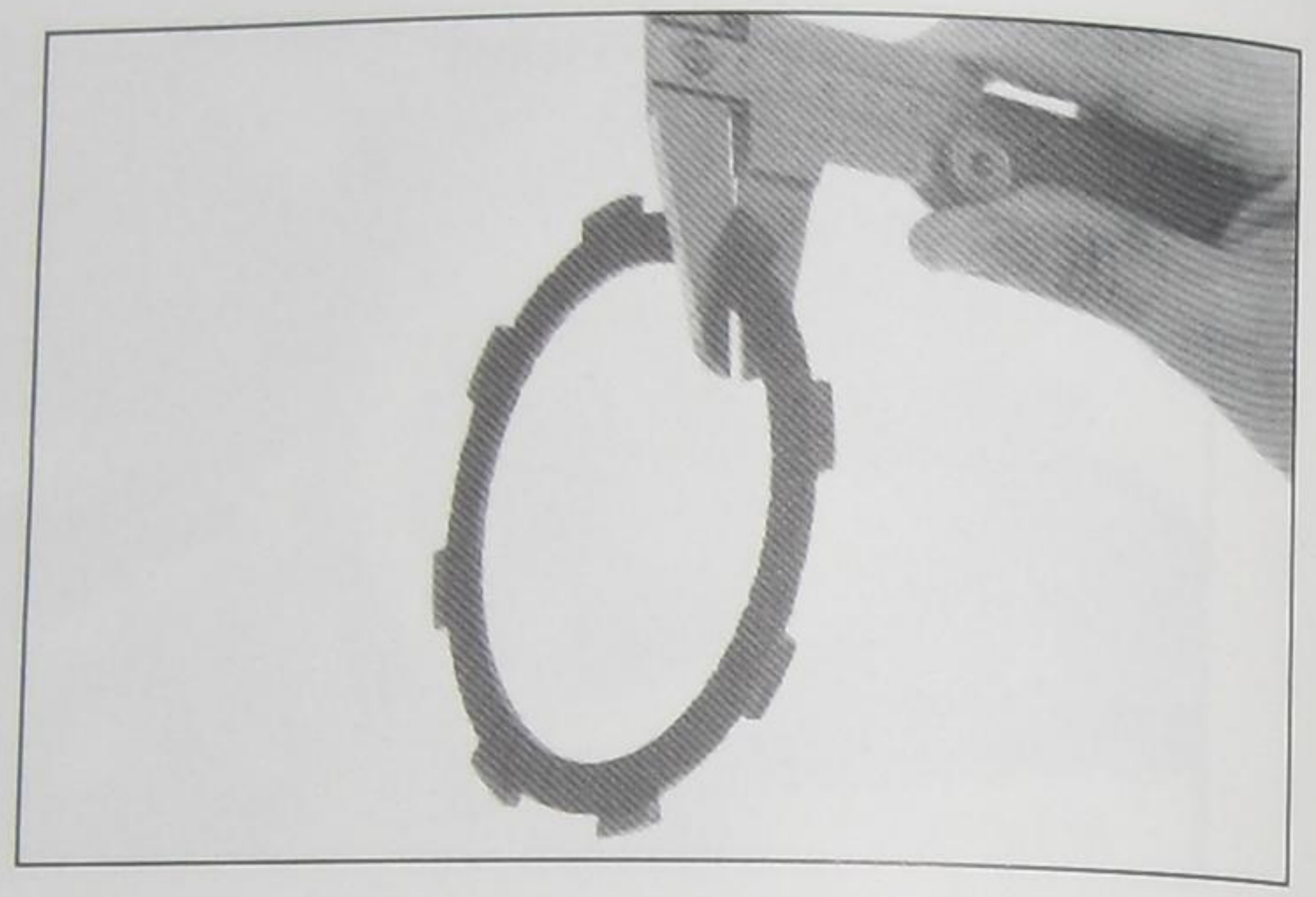


**CLUTCH DISC**
Check the clutch discs for signs of scoring or discoloration.
Measure the clutch disc thickness.

**SEVICE LIMIT: 2.6 mm (0.10 in)**

NOTE:

- Replace the clutch discs and plates as a set.



**CLUTCH PLATE**
Check the plates for discoloration.
Check the plate warpage on a surface plate using a feeler gauge.

**SERVICE LIMIT: 0.20 mm (0.008 in)**

NOTE:

- Replace the clutch discs and plates as a set.

**CLUTCH CENTER**
Check the clutch center and pressure plate for nicks, indentations or abnormal wear made by the plates.

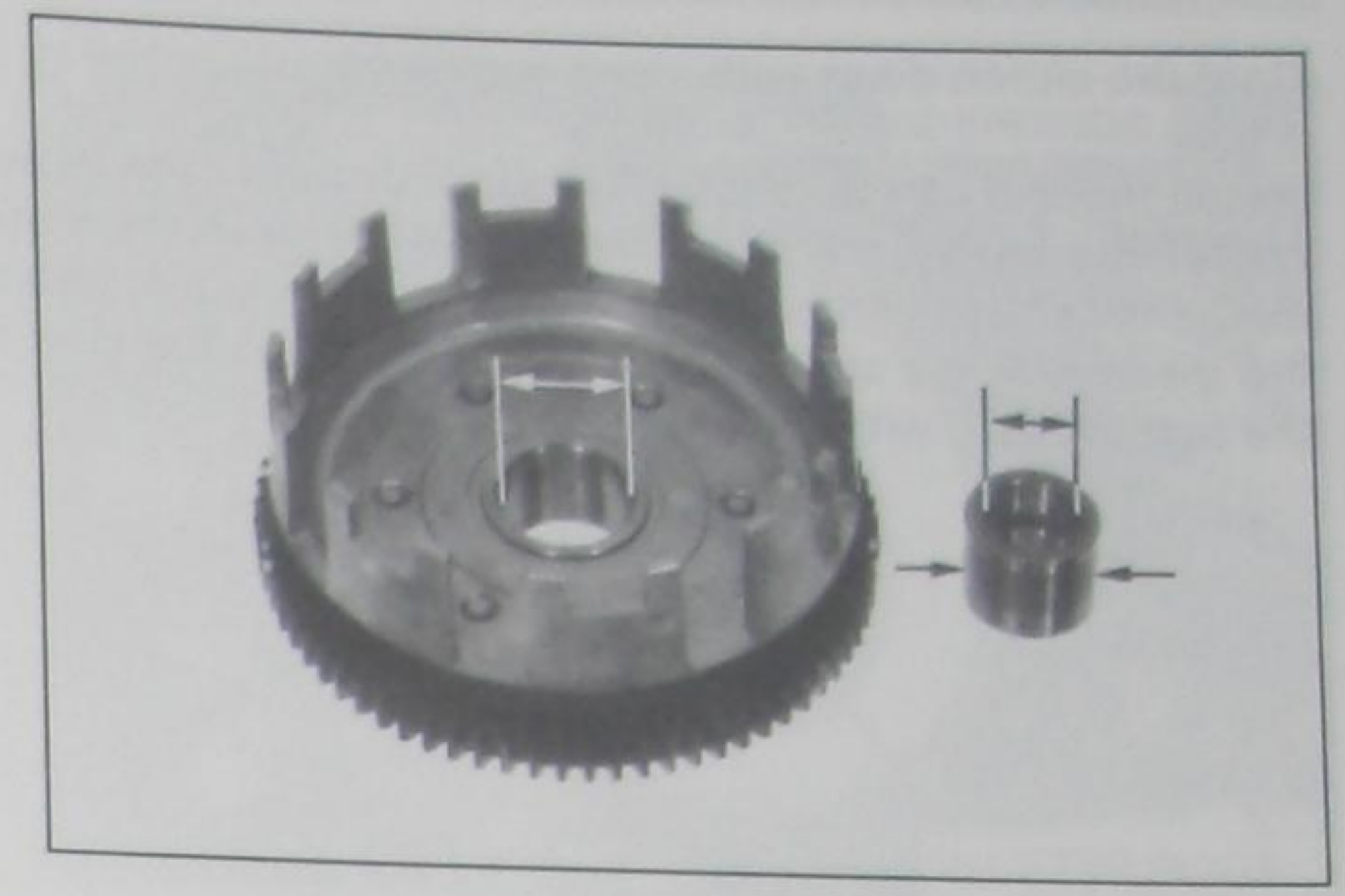
**CLUTCH OUTER/OUTER GUIDE**
Check the primary driven gear teeth for wear or damage.
Check the slots in the clutch outer for nicks, indentation or abnormal wear made by the clutch discs.

Measure the clutch outer I.D.

**SERVICE LIMIT: 28.04 mm (1.104 in)**

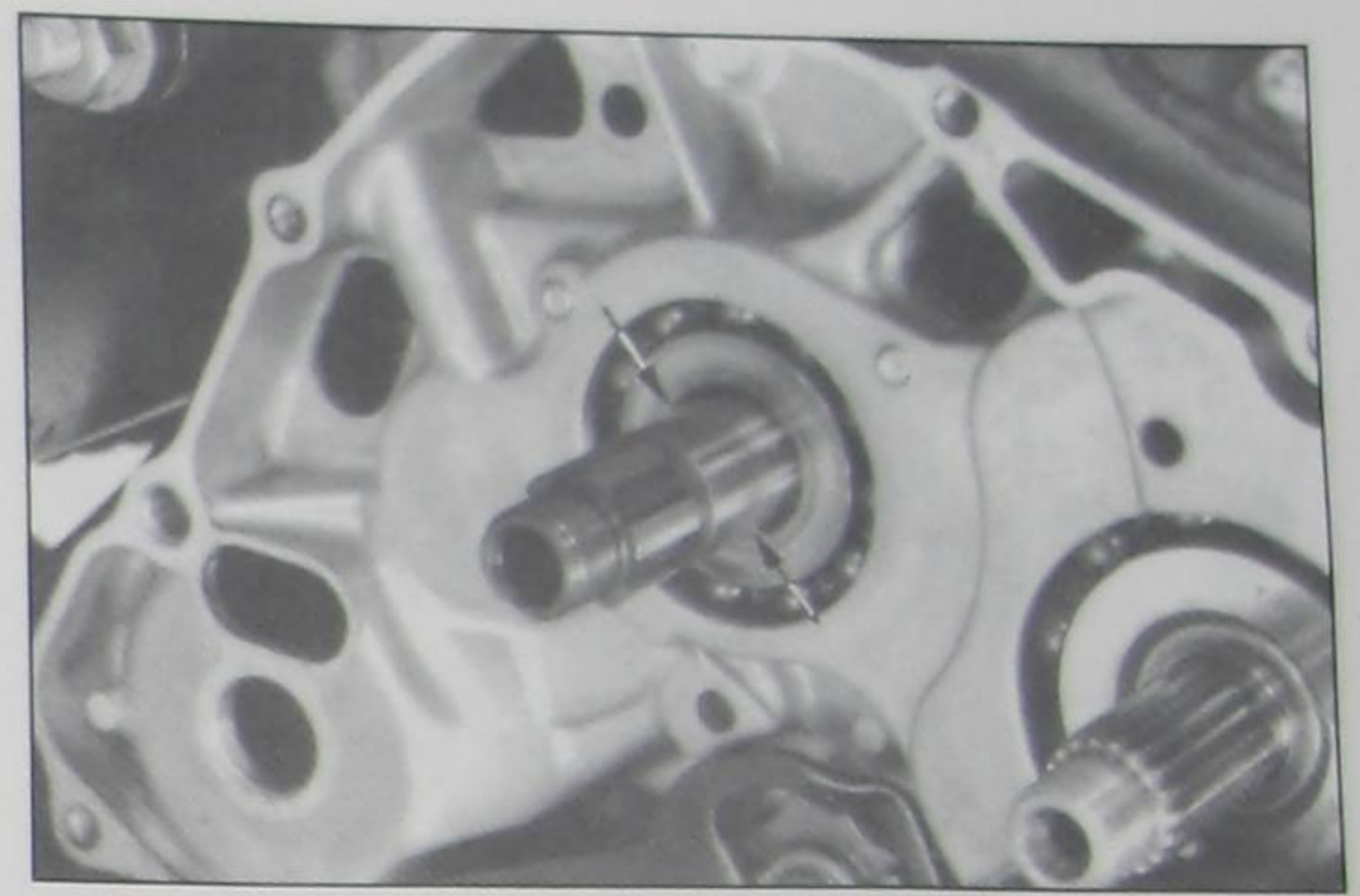
Measure the outer guide O.D. and I.D.

**SERVICE LIMITS: I.D.: 20.02 mm (0.788 in)**
**O.D.: 27.93 mm (1.100 in)**



**MAINSHAFT**
Measure the mainshaft O.D. at clutch outer guide.

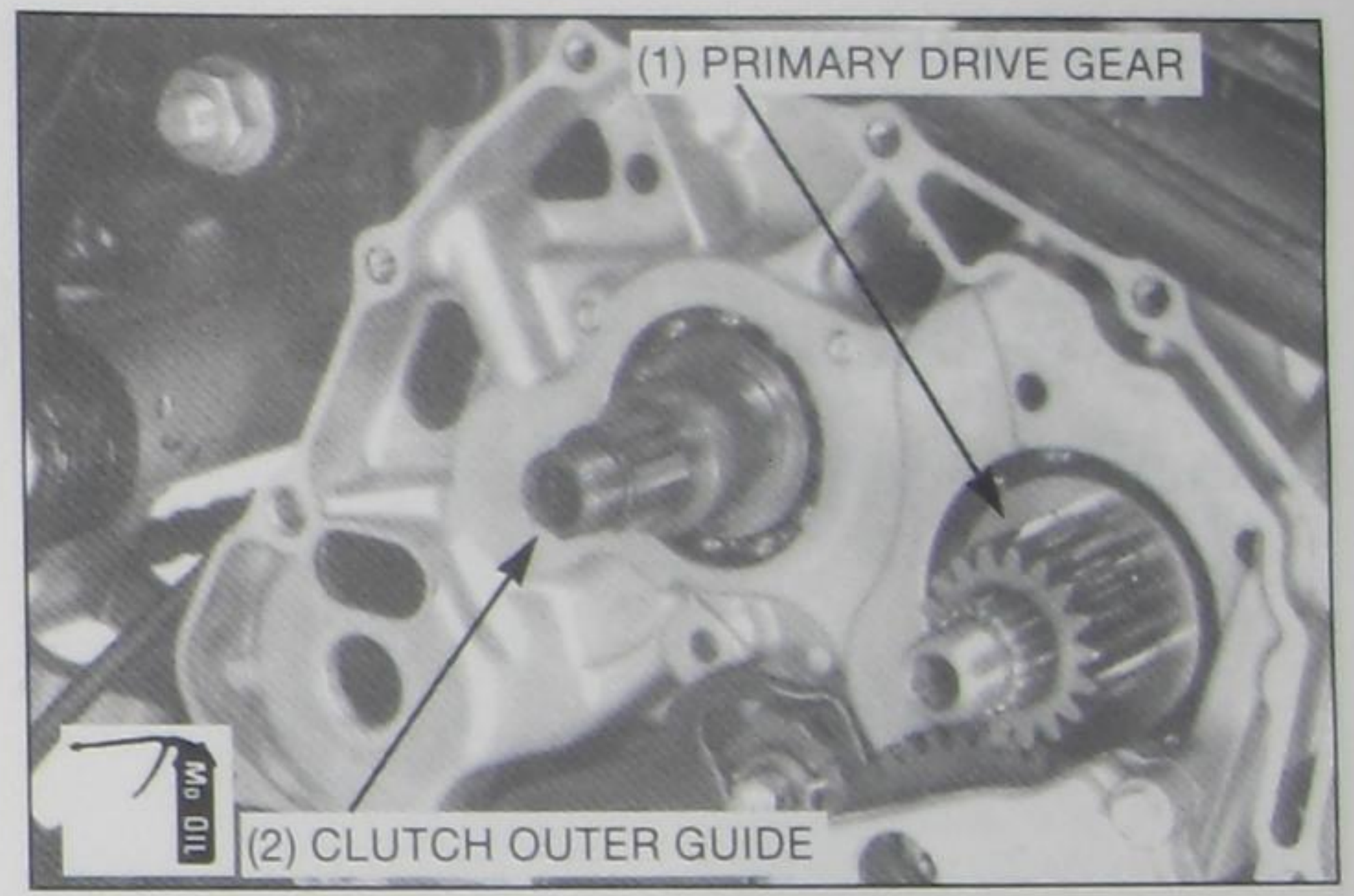
**SERVICE LIMIT: 19.92 mm (0.784 in)**



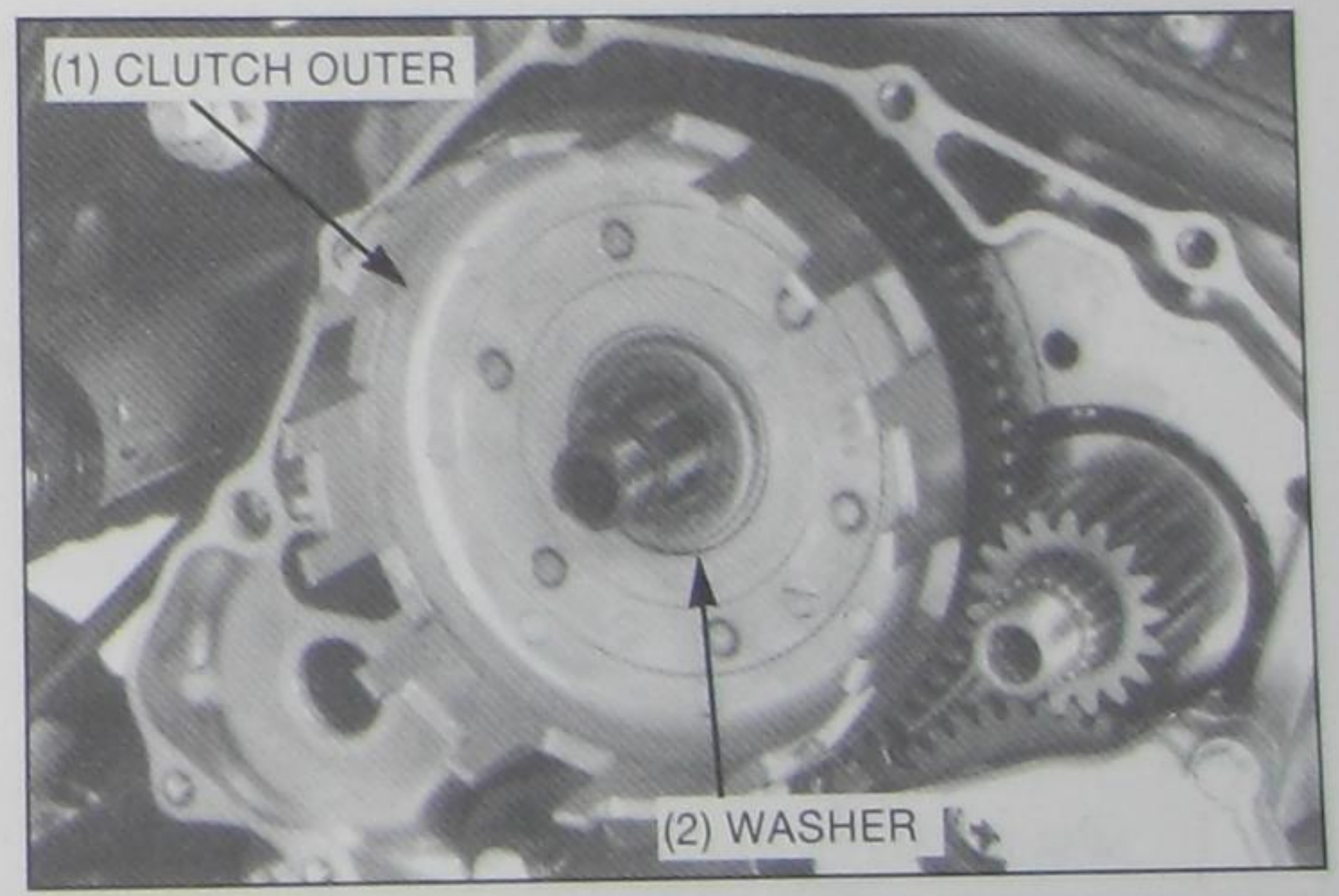
## CLUTCH ASSEMBLY

Install the primary drive gear onto the crankshaft.

Apply molybdenum oil solution to the inner and outer surfaces of the clutch outer guide and install it onto the mainshaft.

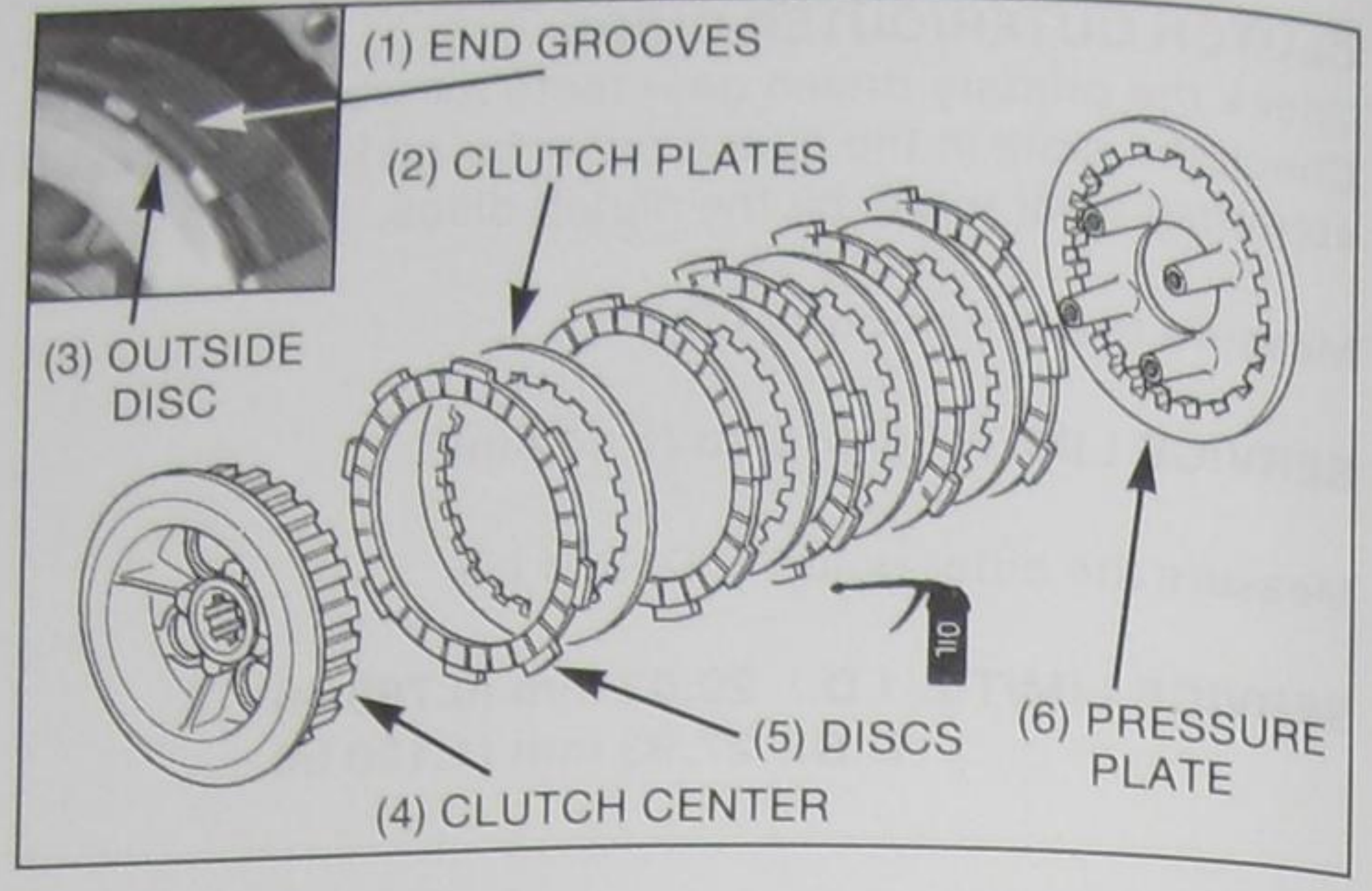


Install the clutch outer onto the outer guide.
Install the thrust washer onto the mainshaft groove and align the spline teeth of the washer and mainshaft as shown.



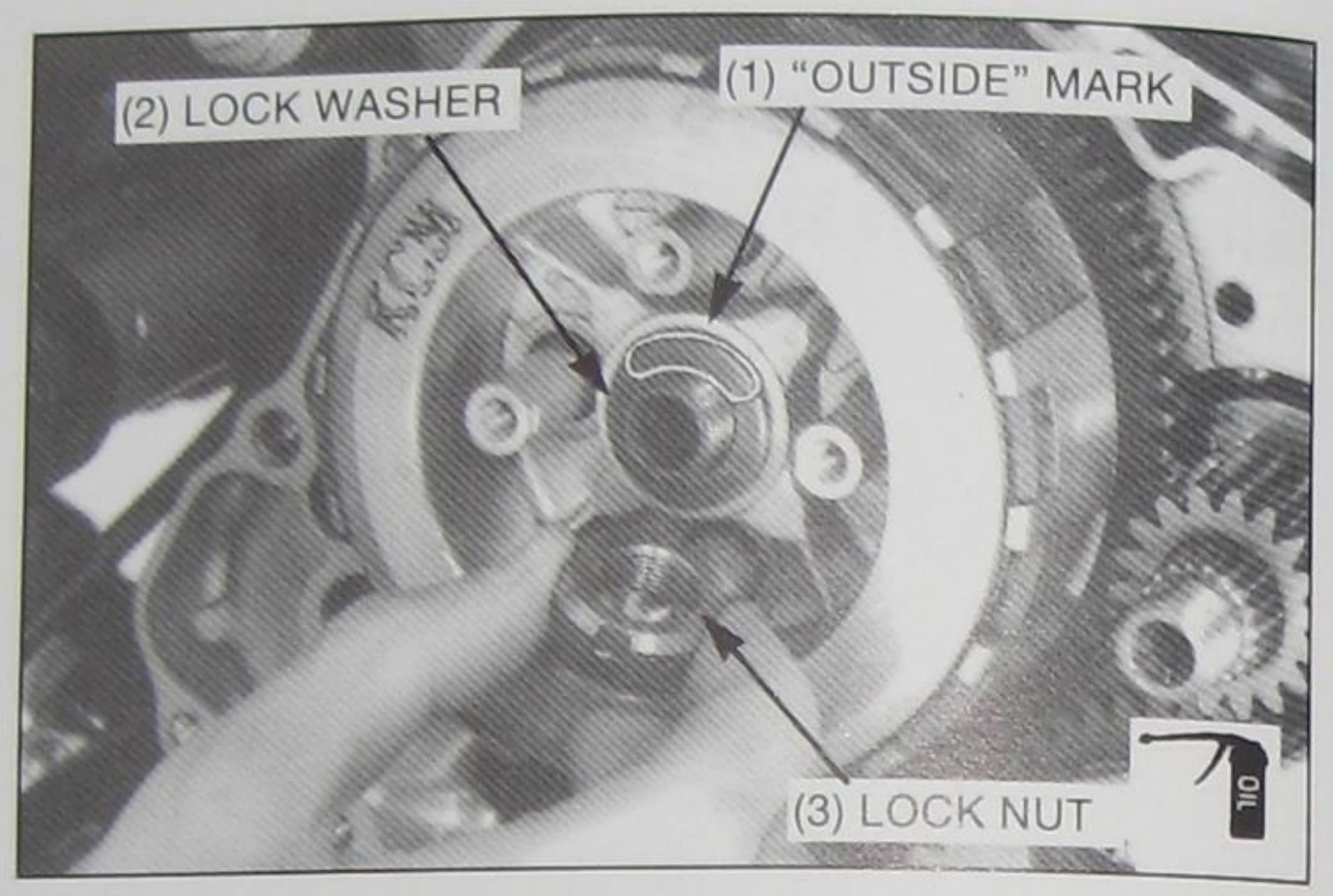
Coat the clutch discs with clean engine oil.

Install the five clutch discs and four plates onto the clutch center alternately, starting a disc. Install the pressure plate. Install the clutch center assembly while aligning the tabs of the discs with the slots in the clutch outer and the tabs of the outside disc with the end grooves.


(1) END GROOVES
(2) CLUTCH PLATES
(3) OUTSIDE DISC
OIL
(5) DISCS
(6) PRESSURE PLATE
(4) CLUTCH CENTER

Install the lock washer onto the mainshaft with the "OUTSIDE" mark facing out.

Apply oil to the threads and seating surface of a new lock nut and install it.

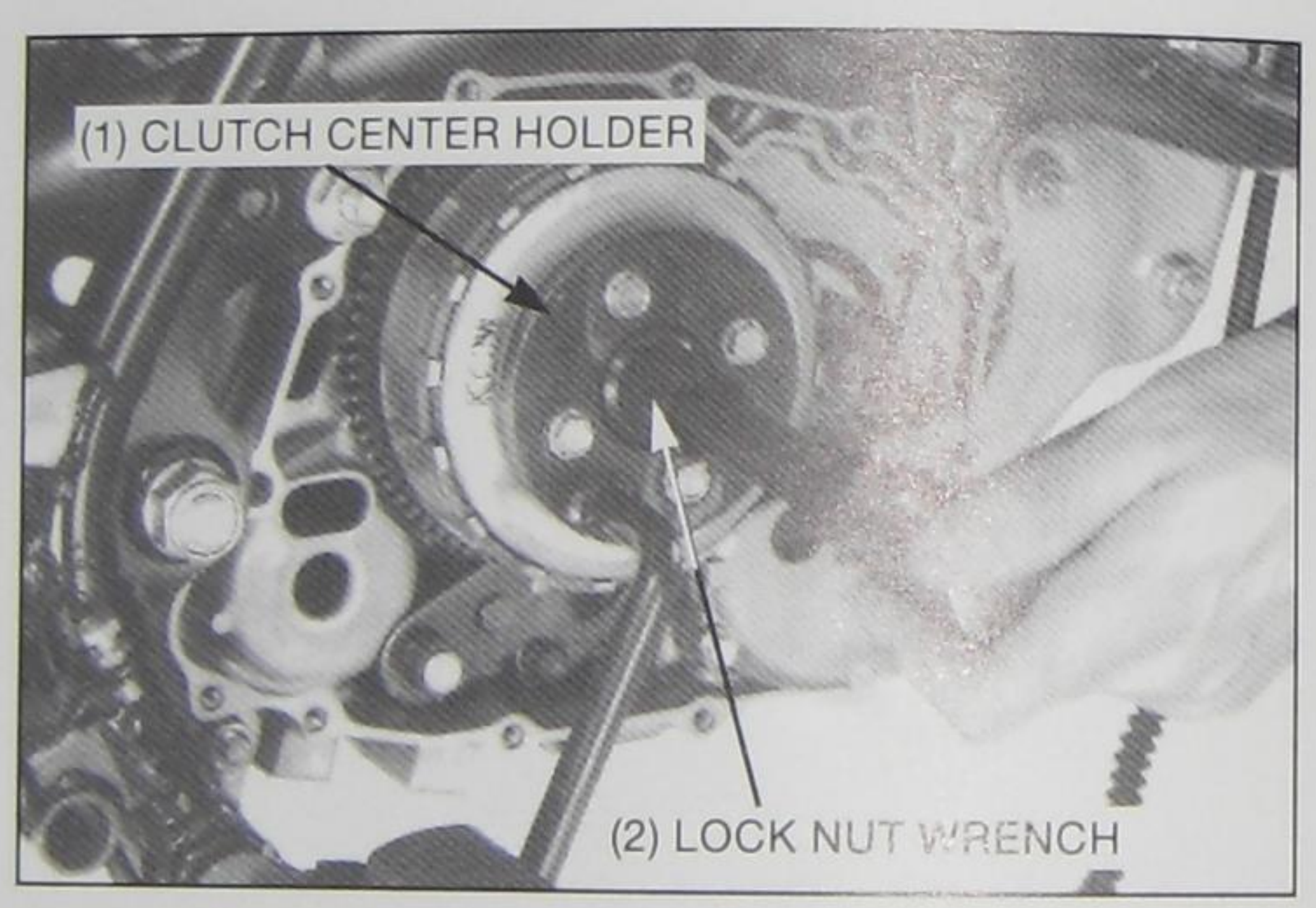

(2) LOCK WASHER
(1) "OUTSIDE" MARK
(3) LOCK NUT
OIL

Hold the clutch center with the special tool and tighten the lock nut.

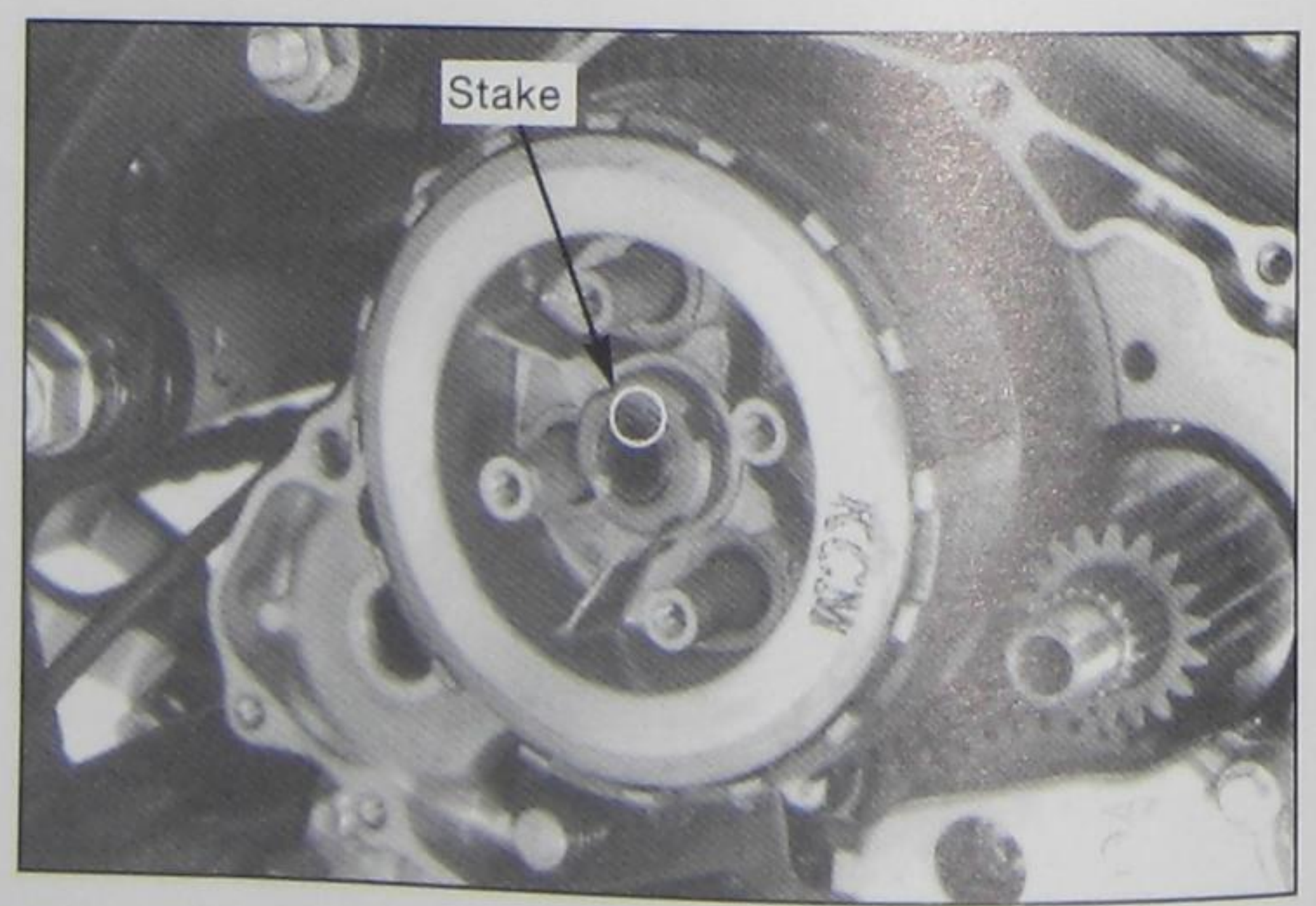
**TOOLS:**

| | |
|---|---|
| **Clutch center holder** | **07GMB-KT70101** |
| **Lock nut wrench, 20 x 24 mm** | **07716-0020100** |

**TORQUE:83 N·m (8.5 kgf-m, 61 lbf-ft)**


(1) CLUTCH CENTER HOLDER
(2) LOCK NUT WRENCH

Stake the lock nut into the mainshaft groove, being careful not to damage the mainshaft threads.



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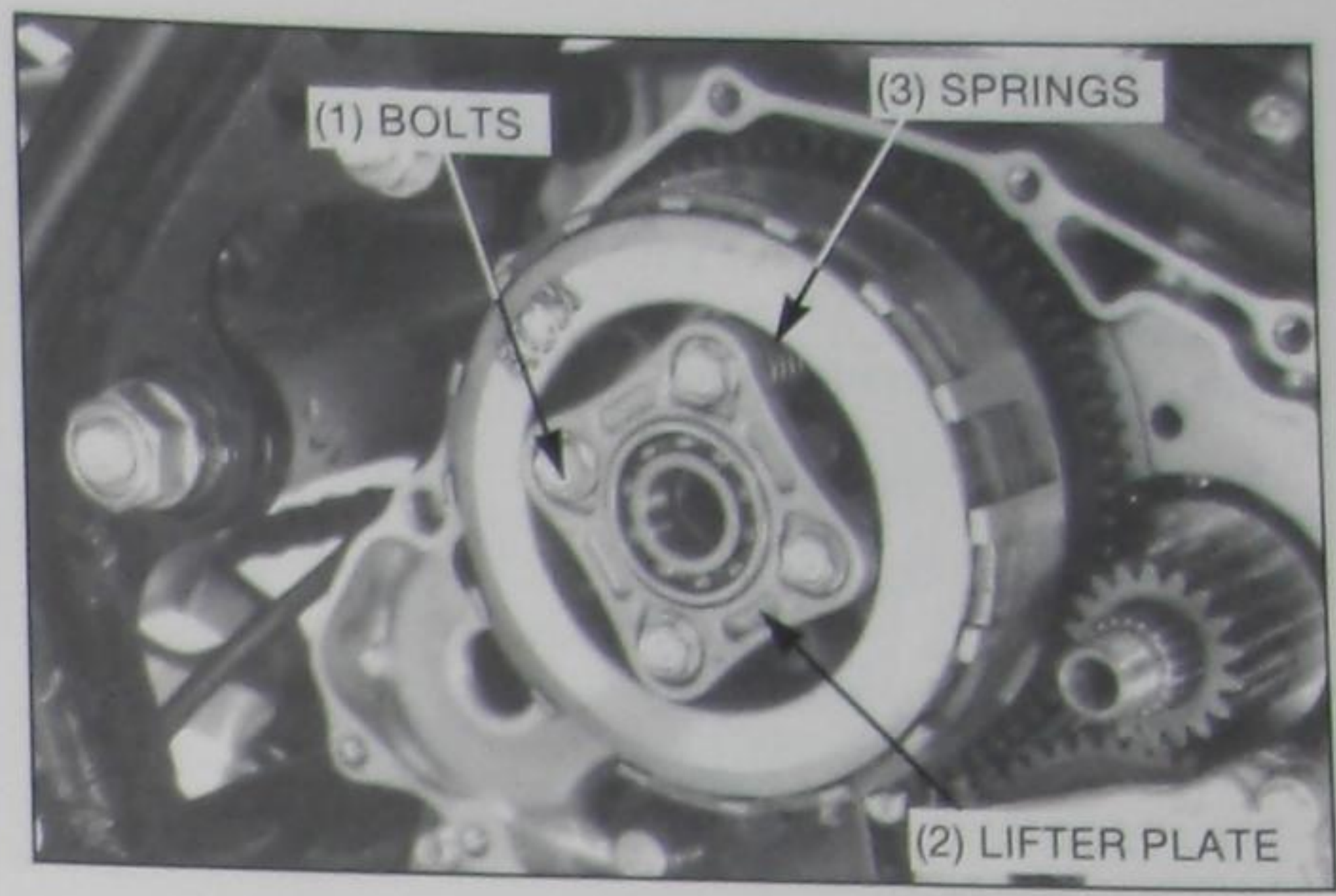
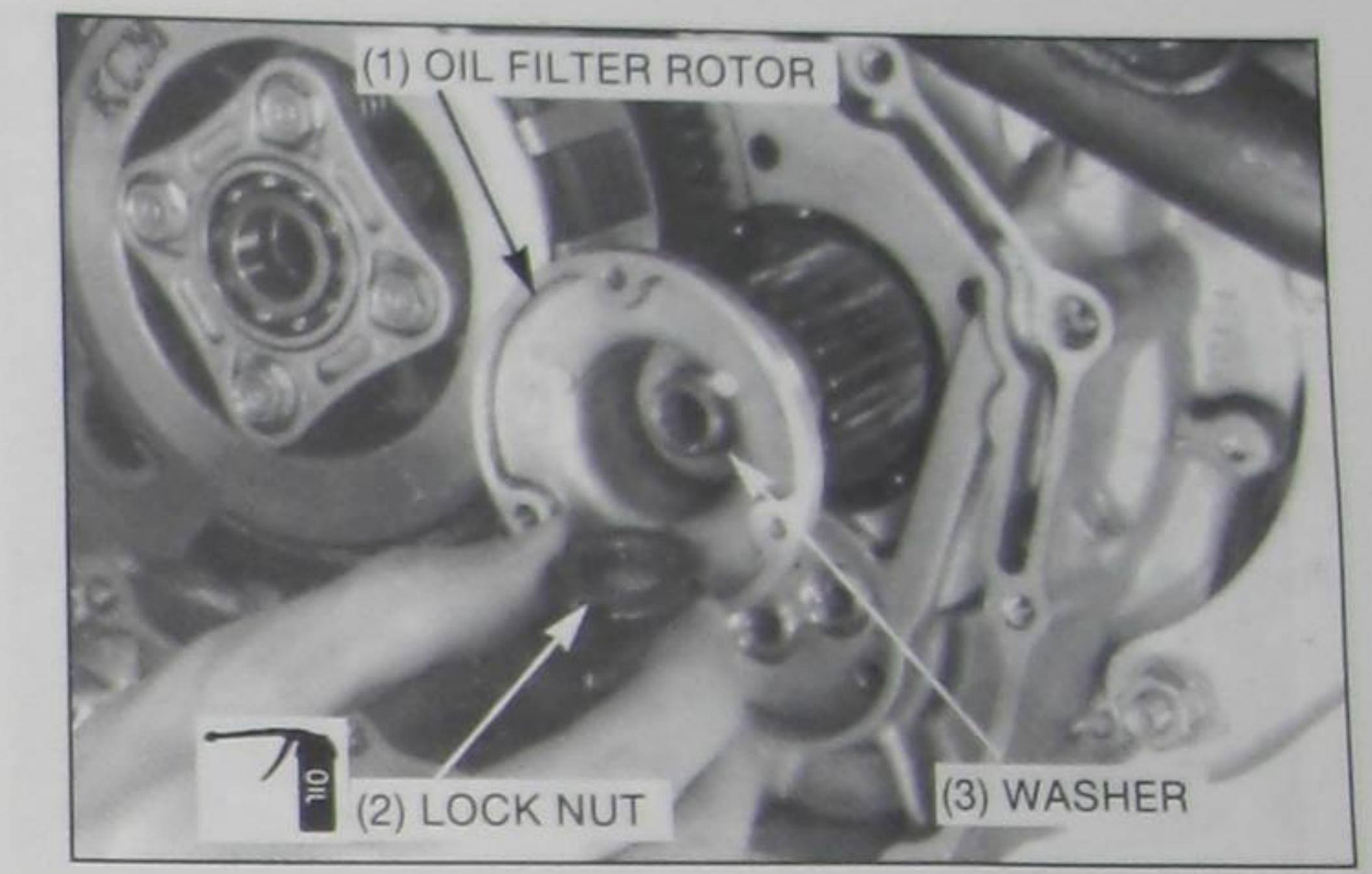
Install the clutch springs, lifter plate and bolts.
Tighten the bolts in a crisscross pattern in several steps.

**TORQUE:12 N·m (1.2 kgf-m, 9 lbf-ft)**


(1) BOLTS
(3) SPRINGS
(2) LIFTER PLATE

Remove the oil pump (page 4-2).

Install the oil filter rotor and washer onto the crankshaft.
Apply oil to the threads and seating surface of the oil filter rotor lock nut.
Install the lock nut with the chamfered side facing inside.


(1) OIL FILTER ROTOR
OIL
(2) LOCK NUT
(3) WASHER

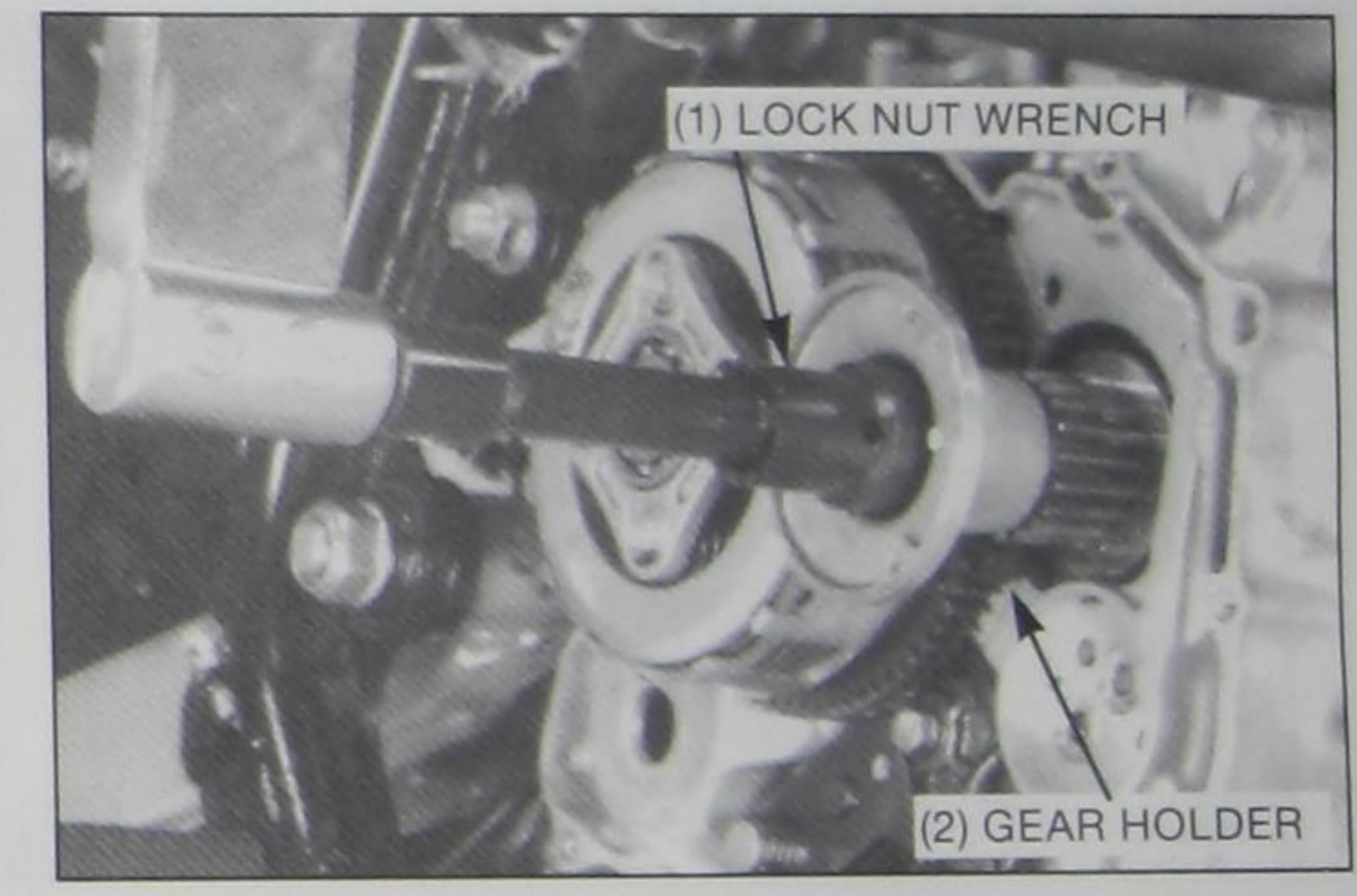
Install the special tool between the primary drive and driven gears as shown and tighten the lock bolt.

**TOOL:**

| | |
|---|---|
| **Gear holder** | **07724-0010200** |
| **Lock nut wrench, 20 x 24 mm** | **07716-0020100** |

**TORQUE:83 N·m (8.5 kgf-m, 61 lbf-ft)**

Install the oil pump (page 4-5).


(1) LOCK NUT WRENCH
(2) GEAR HOLDER

## CLUTCH LIFTER ASSEMBLY

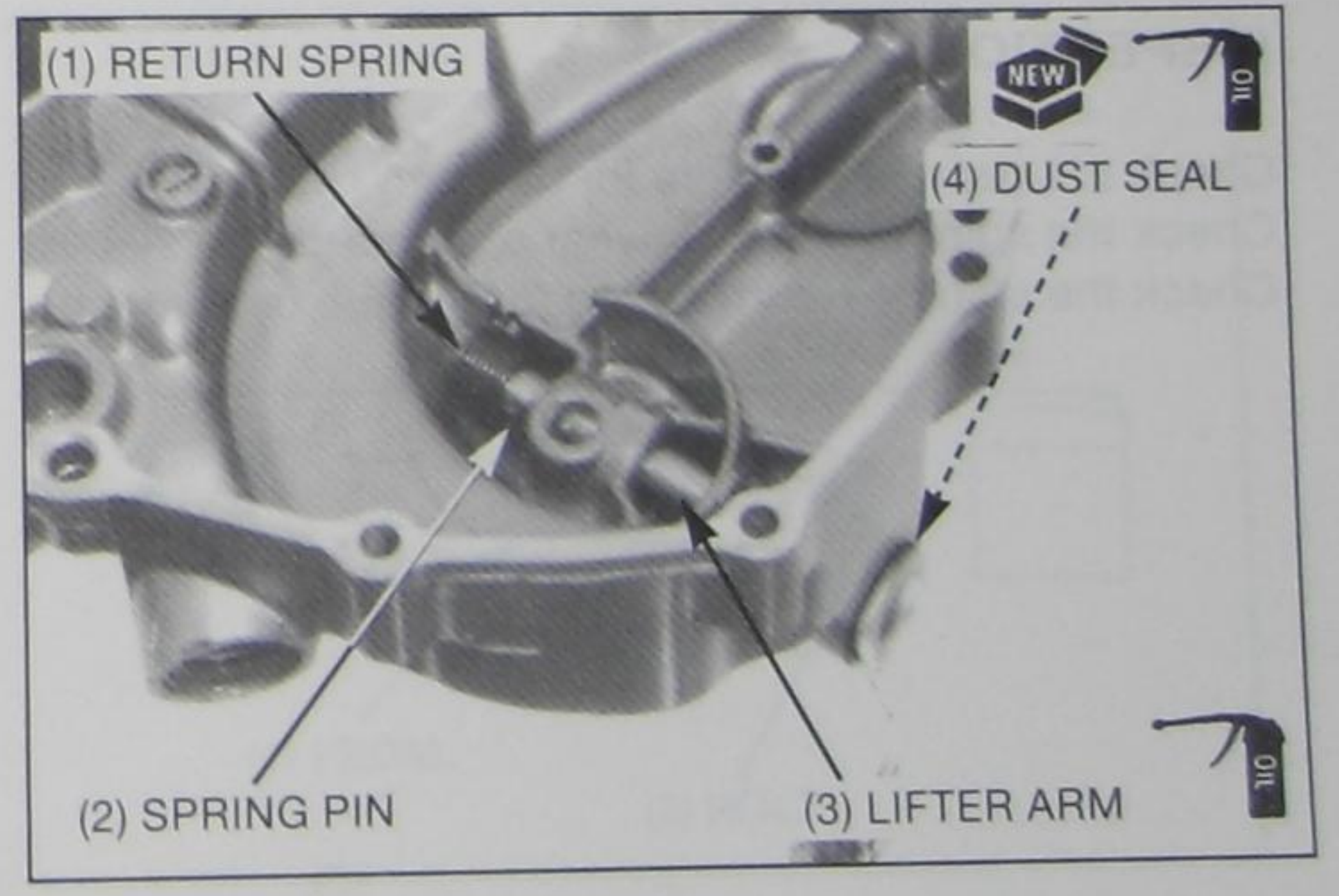
Apply oil to a new dust deal lip and install it into the crankcase cover.

Apply oil to the clutch lifter arm spindle and install it.
Drive the spring pin from the opposite side of the arm to project it as recorded when disassembling.

**TOOL:**

| | |
|---|---|
| **Pin driver, 3 mm** | **07744-0010200** |

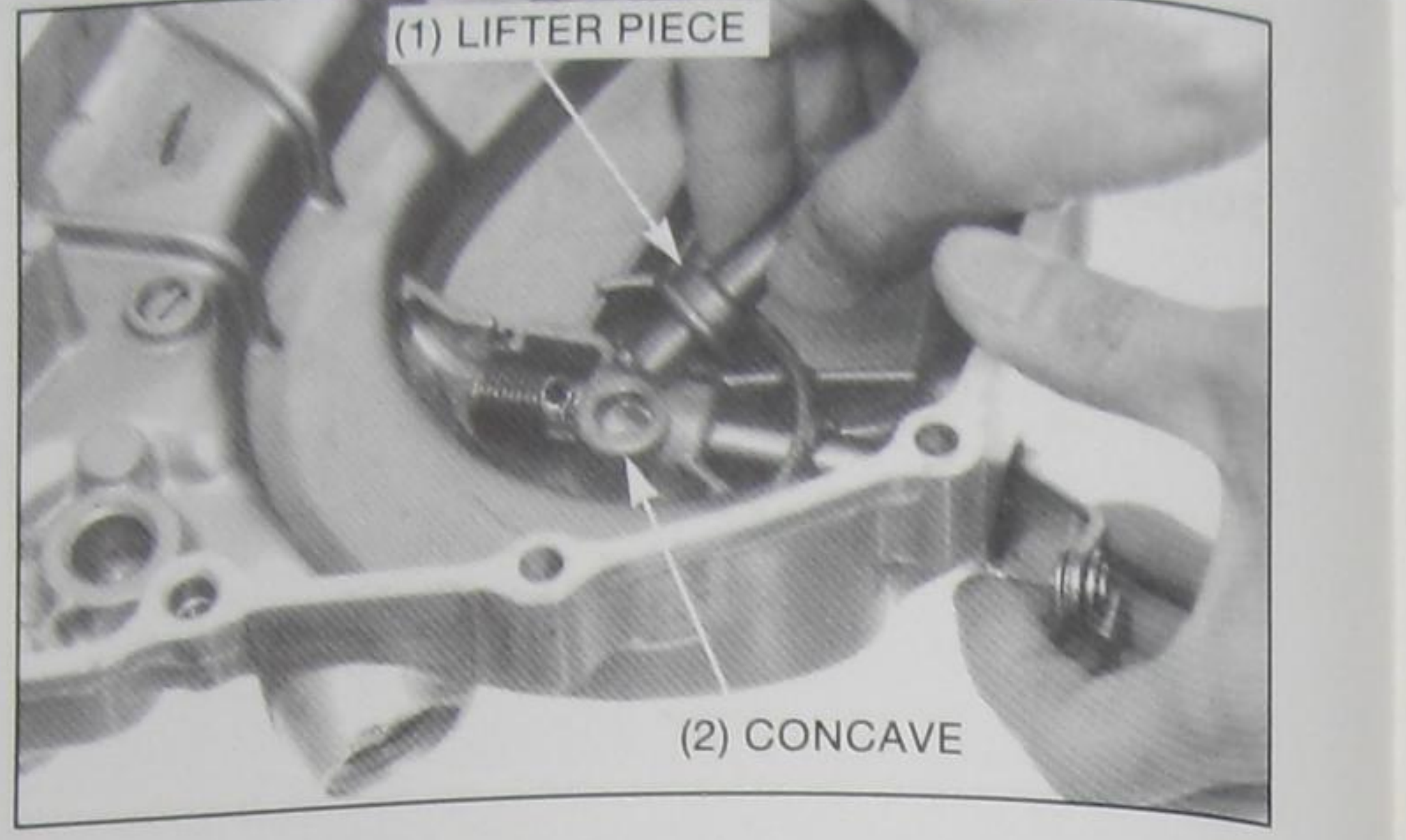
Install the return spring as shown.


(1) RETURN SPRING
NEW
OIL
(4) DUST SEAL
(2) SPRING PIN
(3) LIFTER ARM
OIL

Install the lifter piece into the spindle concave while aligning the concave with the lifter piece hole.

After installing, check for smooth operation.

Install the right crankcase cover (page 9-12).


(1) LIFTER PIECE
(2) CONCAVE

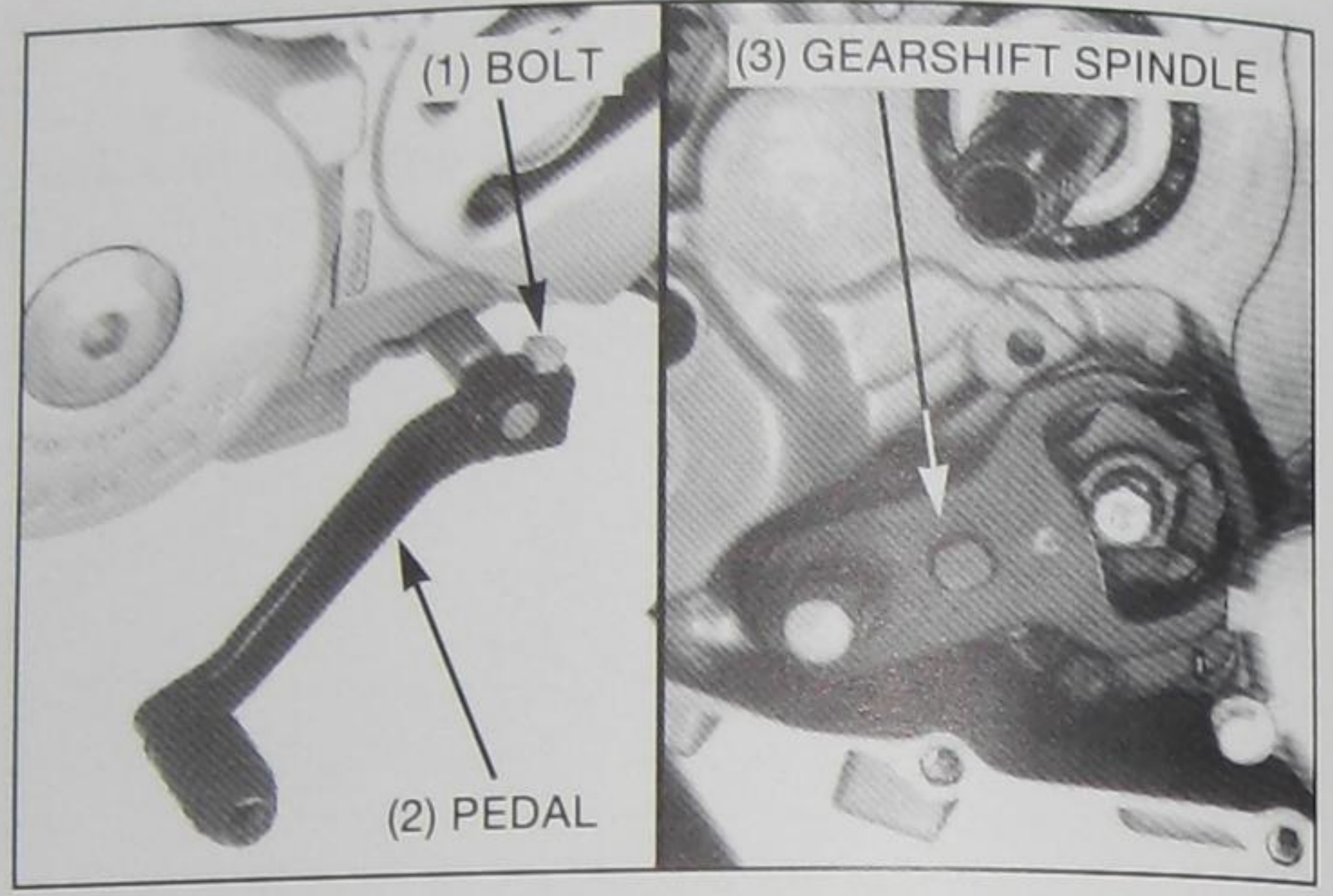
## Gearshift Linkage

### REMOVAL

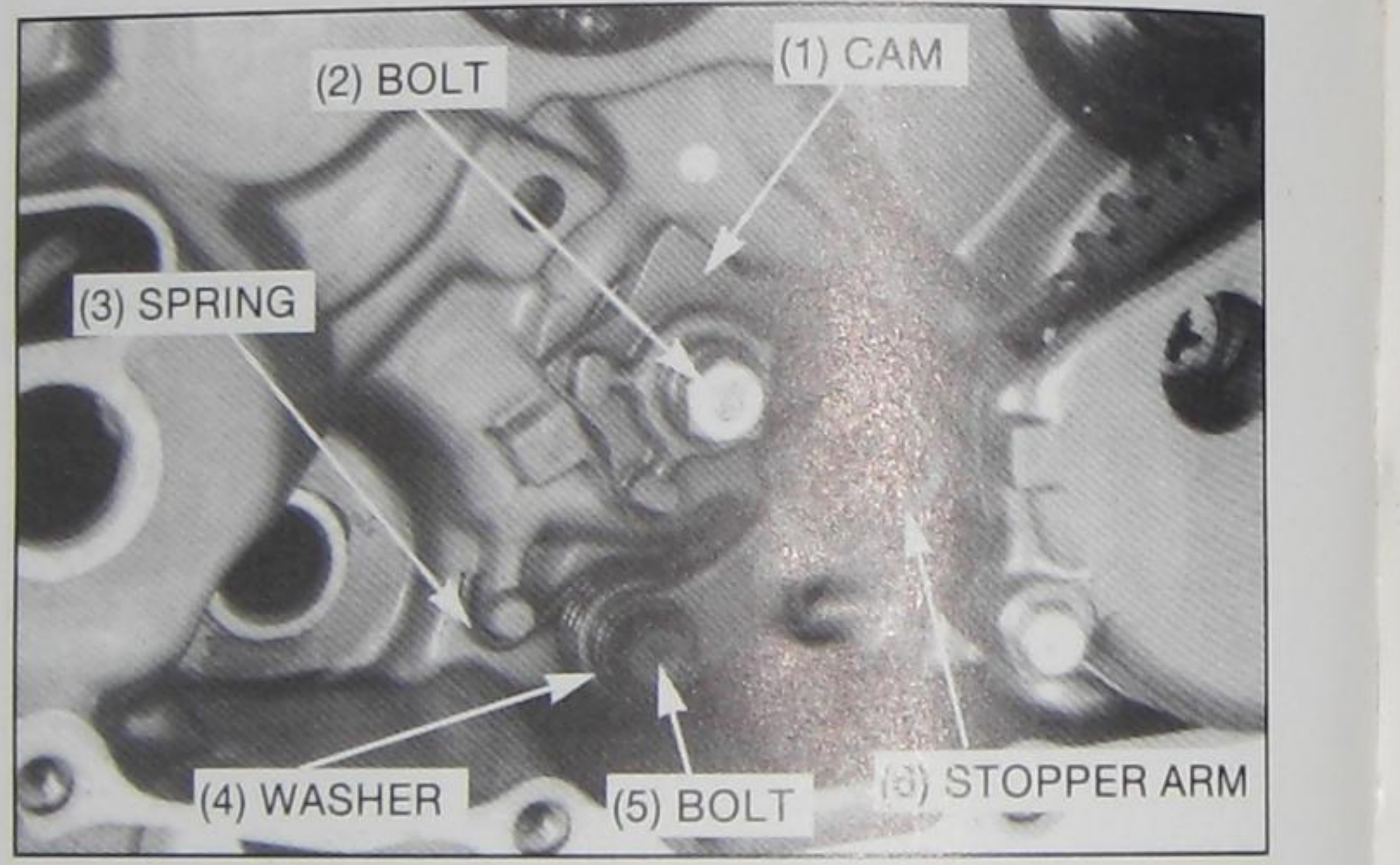
Disassemble the clutch to the clutch outer (page 9-3).

Remove the bolt and the gearshift pedal.

Remove the gearshift spindle assembly and thrust washer.


(1) BOLT
(3) GEARSHIFT SPINDLE
(2) PEDAL

Remove the gearshift cam bolt and gearshift cam.
Remove the dowel pin from the shift drum.
Remove the stopper arm bolt, arm, washer and return spring.


(2) BOLT
(1) CAM
(3) SPRING
(4) WASHER
(5) BOLT
(6) STOPPER ARM

### INSPECTION

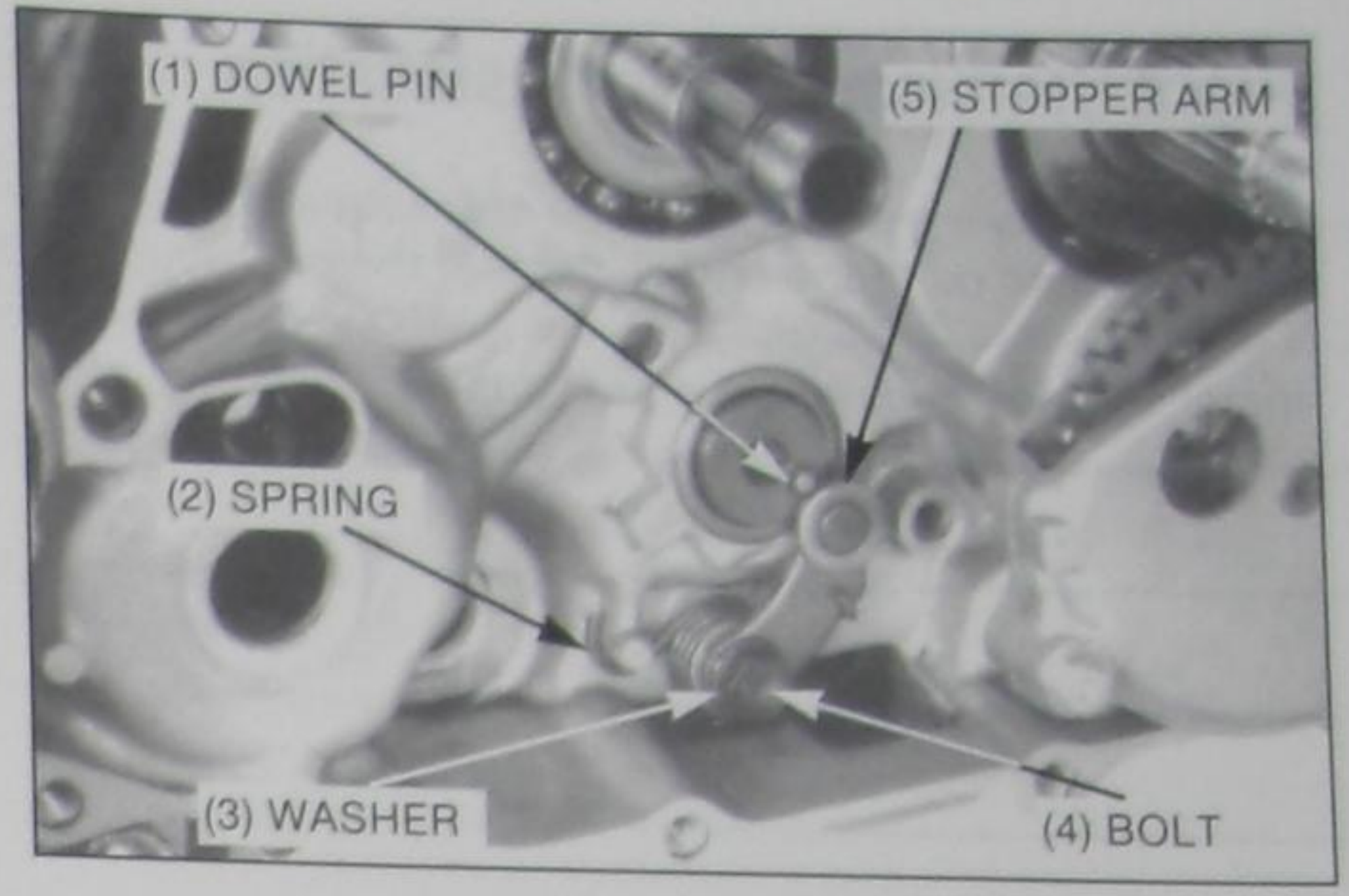
Check the gearshift spindle for bending.
Check the spindle plate for wear or damage.
Check the spindle return spring for fatigue or damage.

### INSTALLATION

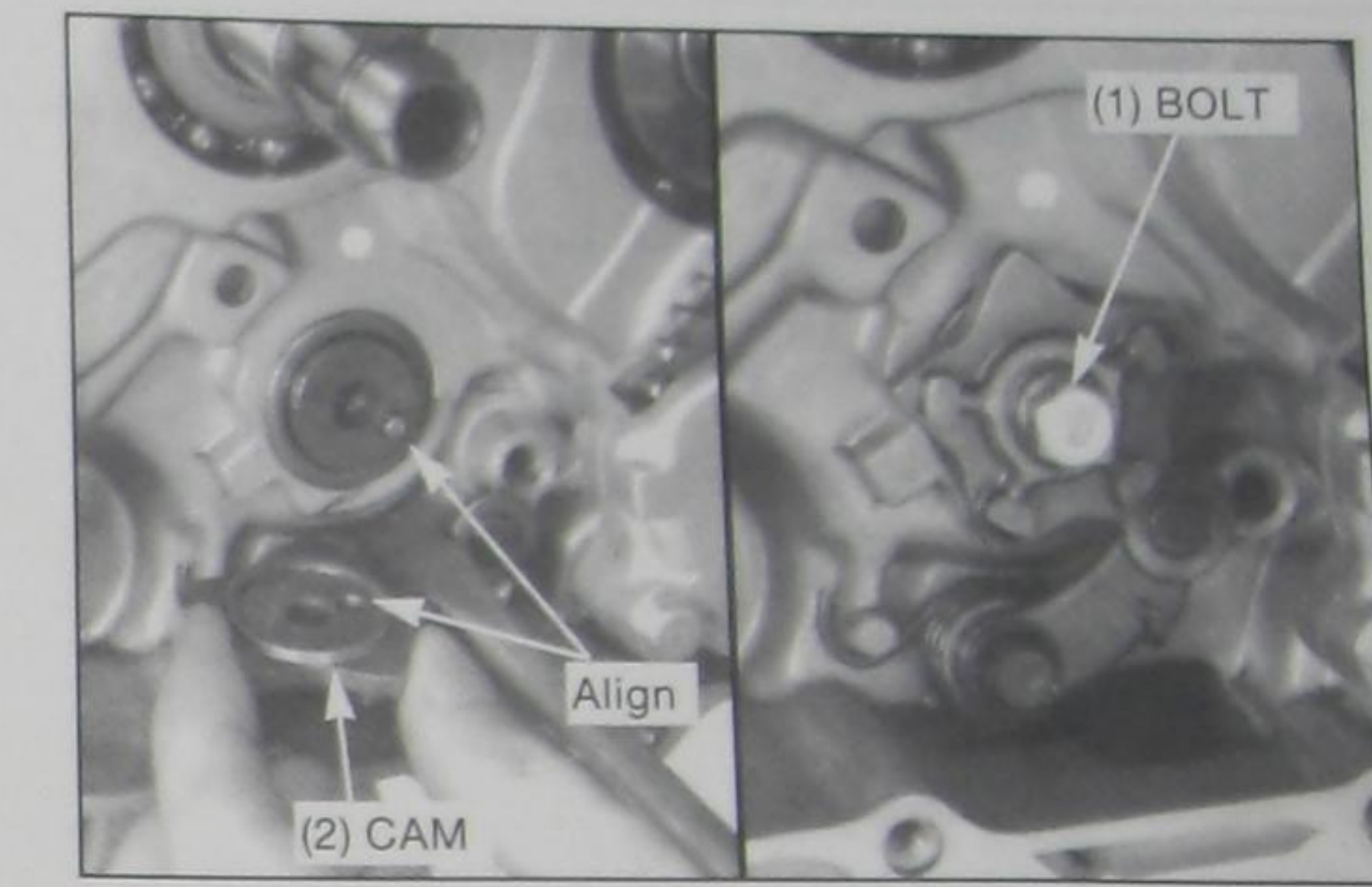
Install the stopper arm, washer (between the spring and arm), spring and bolt, and tighten the bolt.

**TORQUE: 12 N·m (1.2 kgf-m, 9 lbf-ft)**

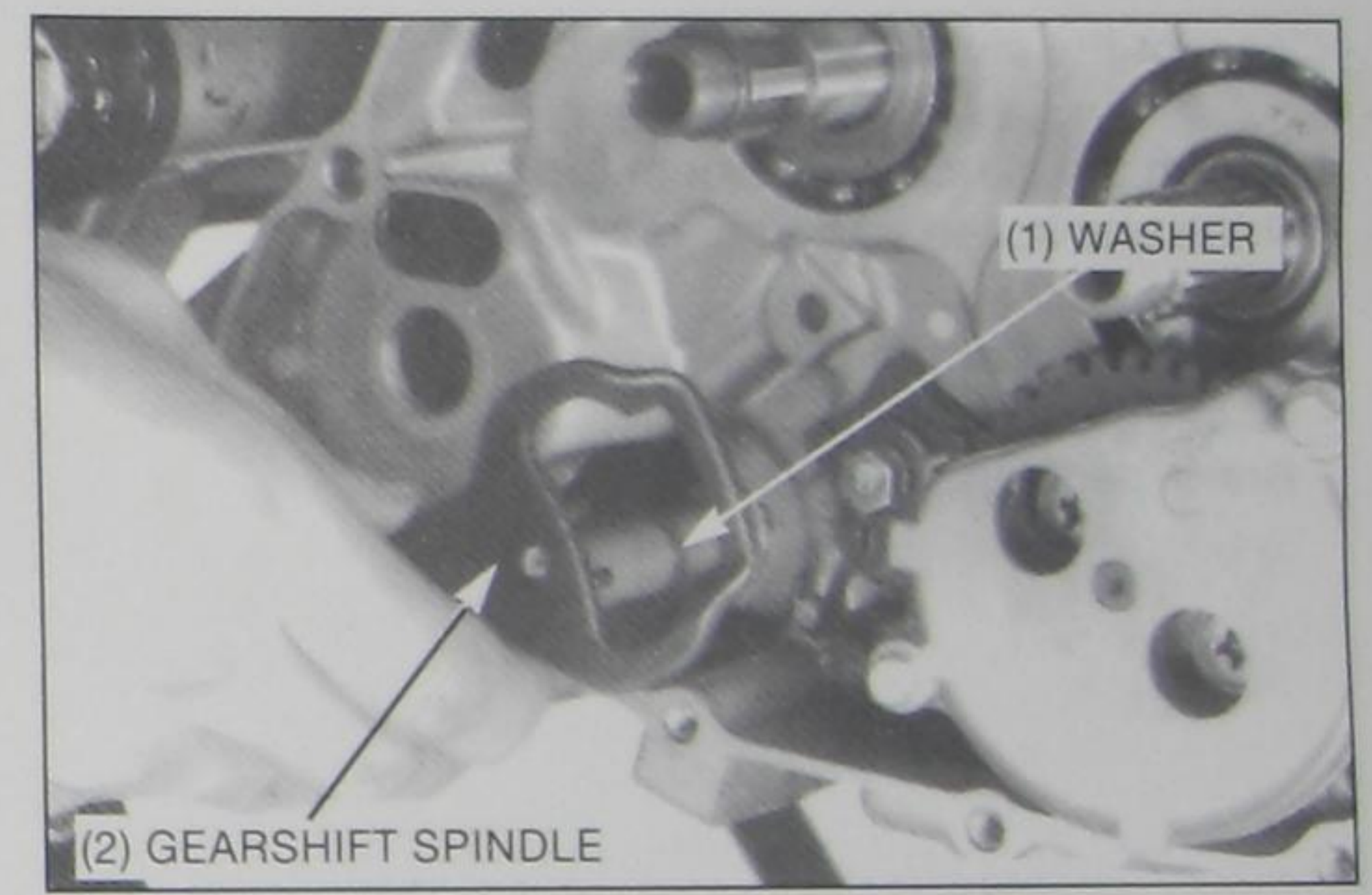
Install the dowel pin into the shift drum.


(1) DOWEL PIN
(5) STOPPER ARM
(2) SPRING
(3) WASHER
(4) BOLT

Hold the stopper arm with a screwdriver and install the gearshift cam by aligning the pin hole with the dowel pin. Install the cam bolt and tighten it.


(1) BOLT
Align
(2) CAM

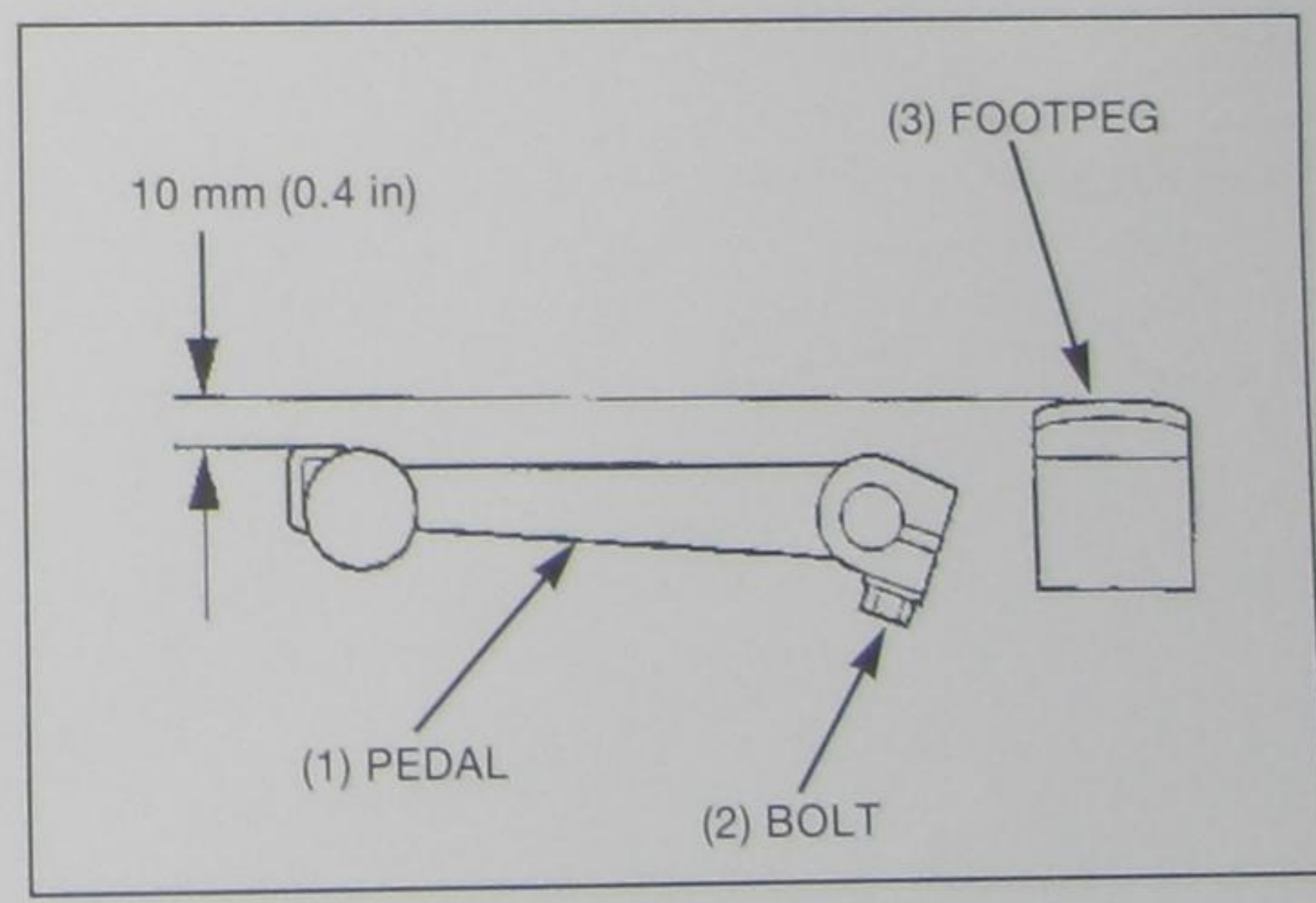
Install the thrust washer onto the gearshift spindle, and insert the spindle into the crankcase, aligning the return spring ends with the lug.


(1) WASHER
(2) GEARSHIFT SPINDLE

Install the gearshift pedal as shown.
Install the pedal bolt and tighten it.

**TORQUE: 12 N·m (1.2 kgf-m, 9 lbf-ft)**

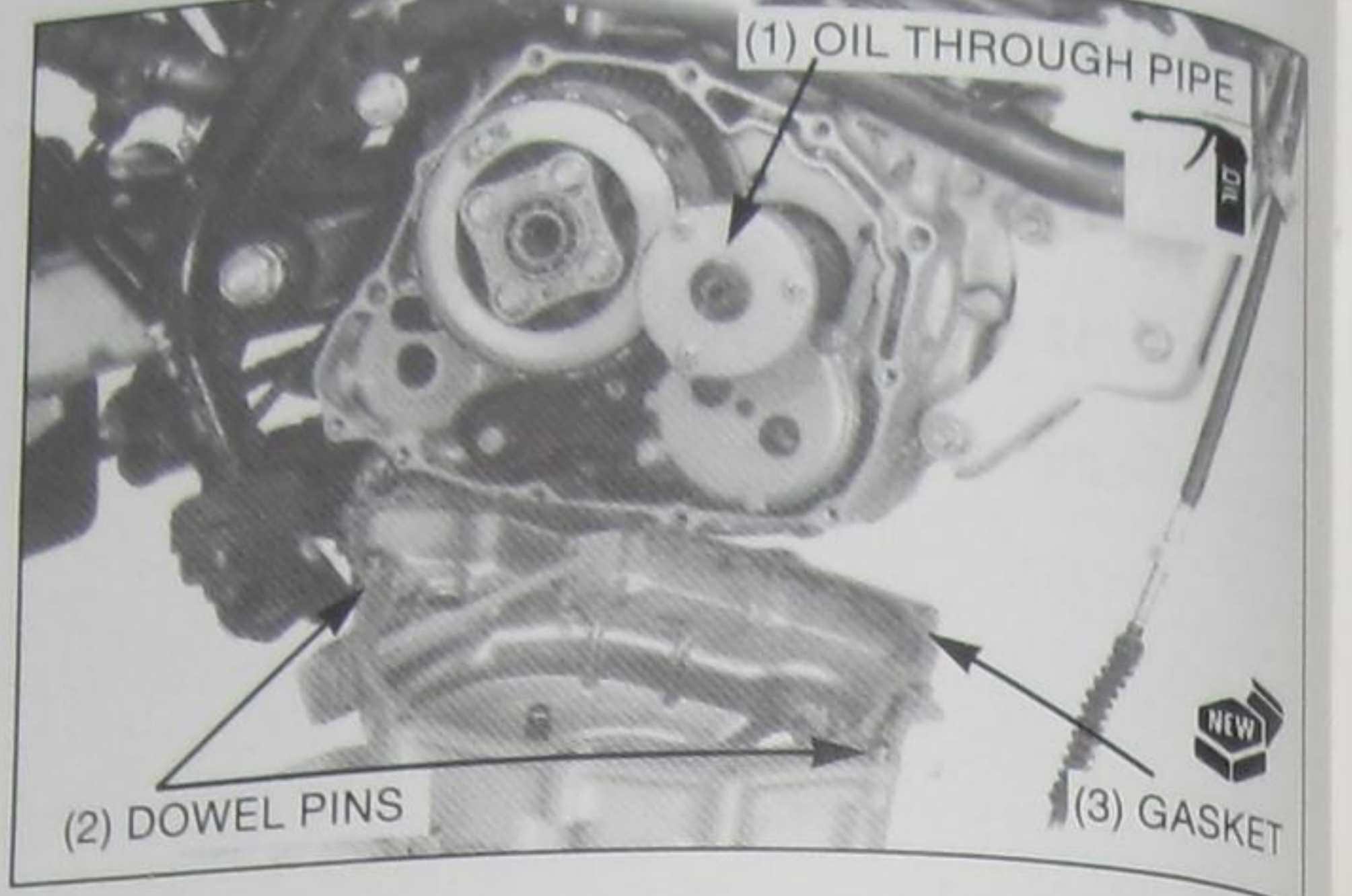
Assemble the clutch (page 9-7).


10 mm (0.4 in)
(3) FOOTPEG
(1) PEDAL
(2) BOLT

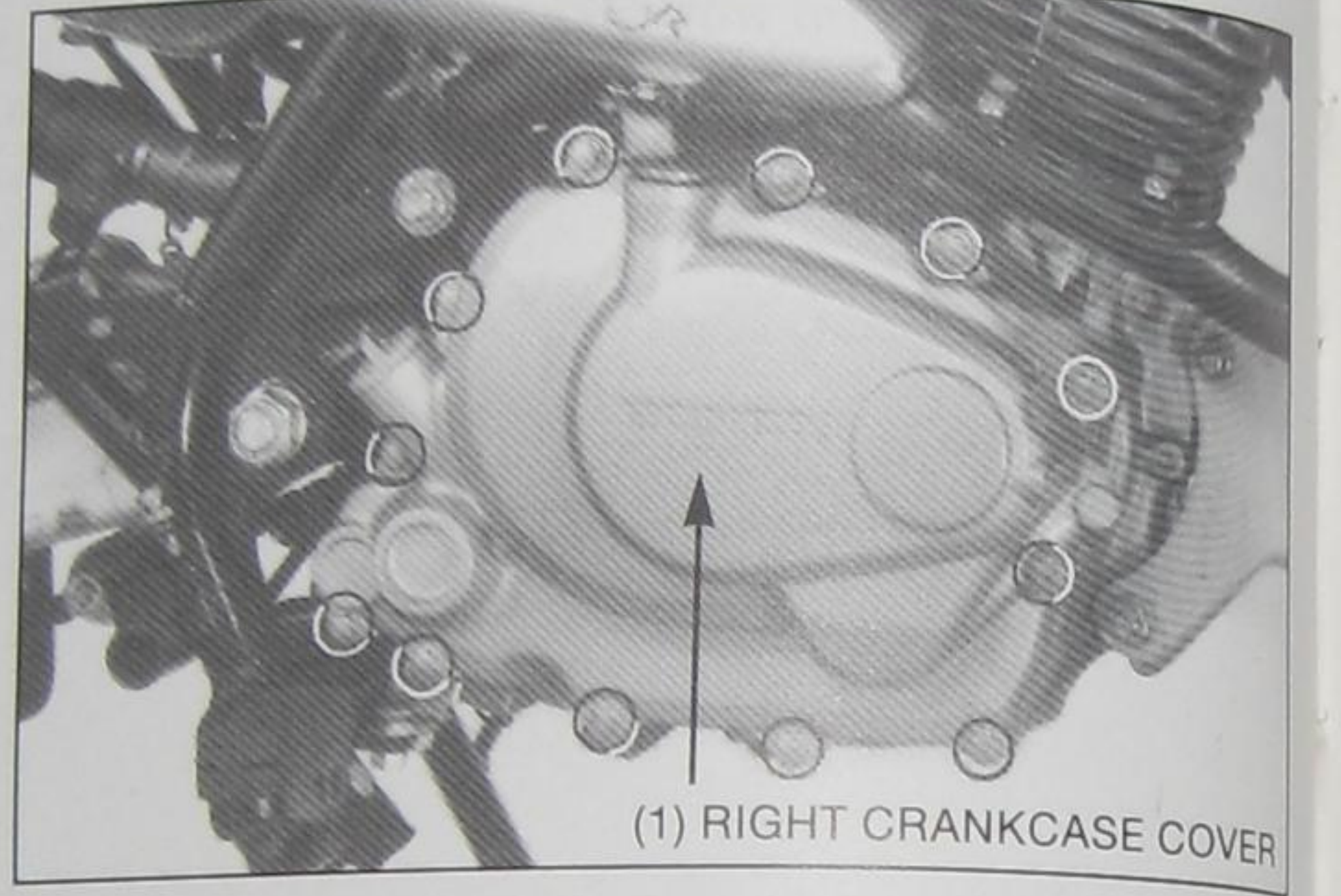
## Right Crankcase Cover Installation

Clean the mating surfaces of the crankcase and cover.
Apply engine oil to the end surface of the oil through pipe.

Install the dowel pins and a new gasket.


(1) OIL THROUGH PIPE
(2) DOWEL PINS
NEW
(3) GASKET

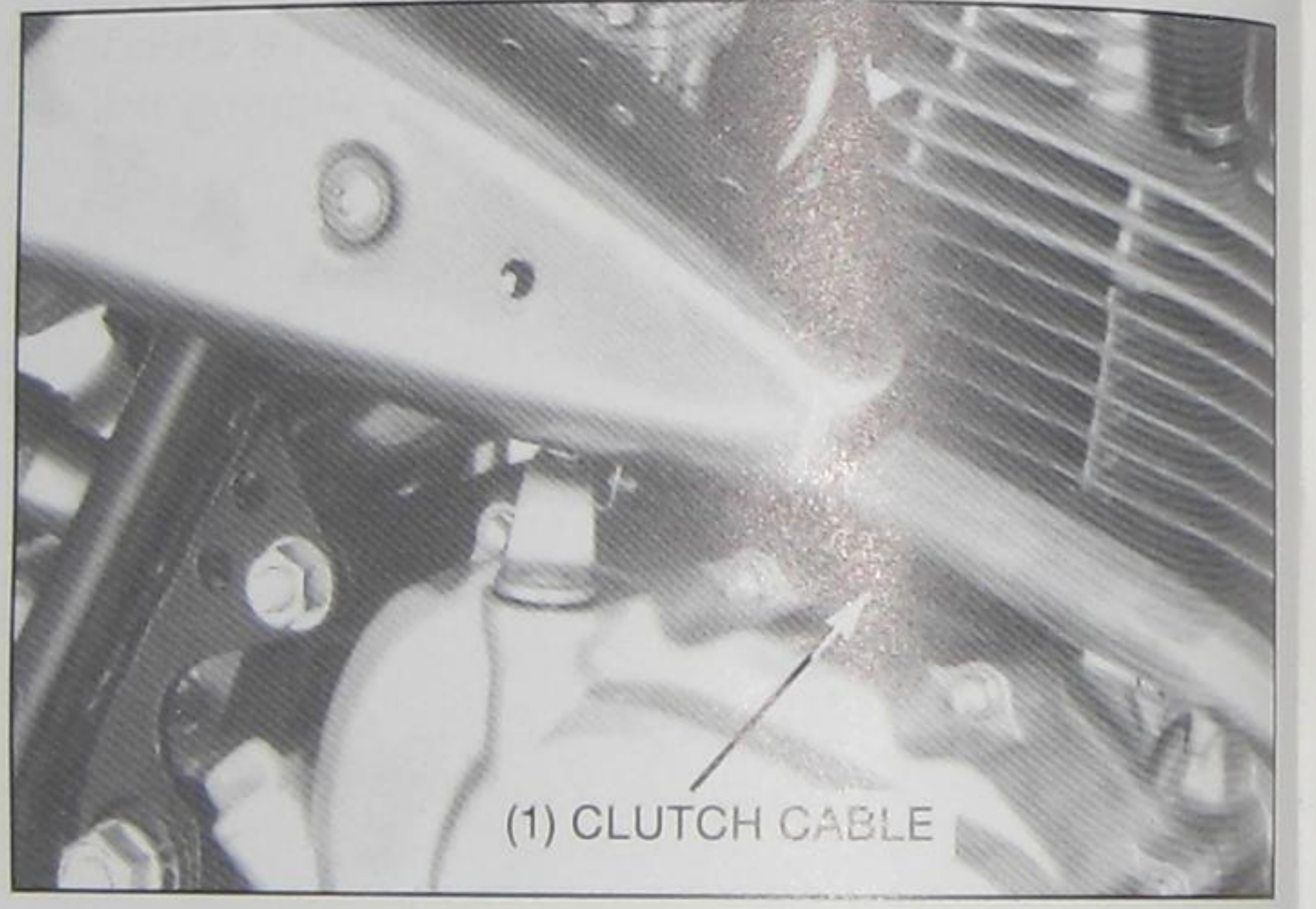
Install the crankcase cover with the twelve bolts.
Tighten the bolts in a crisscross pattern in several steps.


(1) RIGHT CRANKCASE COVER

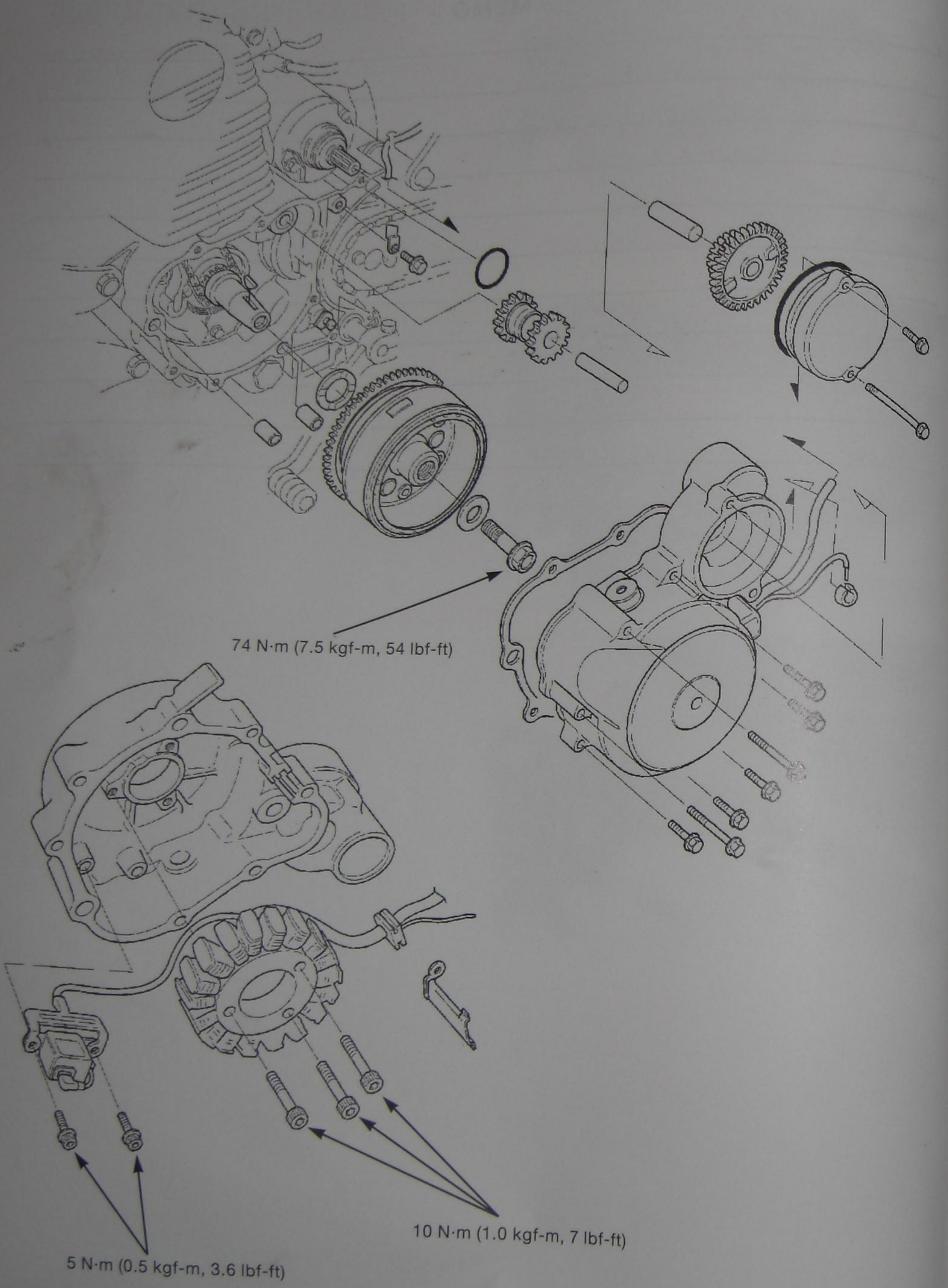
Connect the clutch cable to the clutch lifter arm

Perform the clutch adjustment (page 3-14).
Fill the crankcase with engine oil (page 3-8).

Install the following:
- Under guard (page 2-3).
- Brake pedal (page 13-10).


(1) CLUTCH CABLE

## MEMO


74 N·m (7.5 kgf-m, 54 lbf-ft)
10 N·m (1.0 kgf-m, 7 lbf-ft)
5 N·m (0.5 kgf-m, 3.6 lbf-ft)

# 10. Alternator/Starter Clutch

| | | | |
|---|---|---|---|
| SERVICE INFORMATION | 10-1 | FLYWHEEL REMOVAL | 10-5 |
| TROUBLESHOOTING | 10-1 | STARTER CLUTCH | 10-6 |
| ALTERNATOR STATOR | 10-2 | FLYWHEEL INSTALLATION | 10-8 |

## Service Information

### GENERAL

- This section covers service of the alternator stator, flywheel and starter clutch. These parts can be removed with the engine installed in the frame.
- Refer to section 15 for alternator stator inspection.
- Refer to section 17 for starter motor servicing.

### TORQUE VALUES

| | | |
|---|---|---|
| Ignition pulse generator mounting bolt | 5 N·m (0.5 kgf-m, 3.6 lbf-ft) | Apply locking agent to the threads. |
| Stator bolt | 10 N·m (1.0 kgf-m, 7 lbf-ft) | |
| Starter clutch bolt | 16 N·m (1.6 kgf-m, 12 lbf-ft) | Apply locking agent to the threads. |
| Flywheel bolt | 74 N·m (7.5 kgf-m, 54 lbf-ft) | Apply oil to the threads and seating surface. |

### TOOLS

| | |
|---|---|
| Flywheel holder | 07725-0040000 |
| Rotor puller | 07733-0020001 |

## Troubleshooting

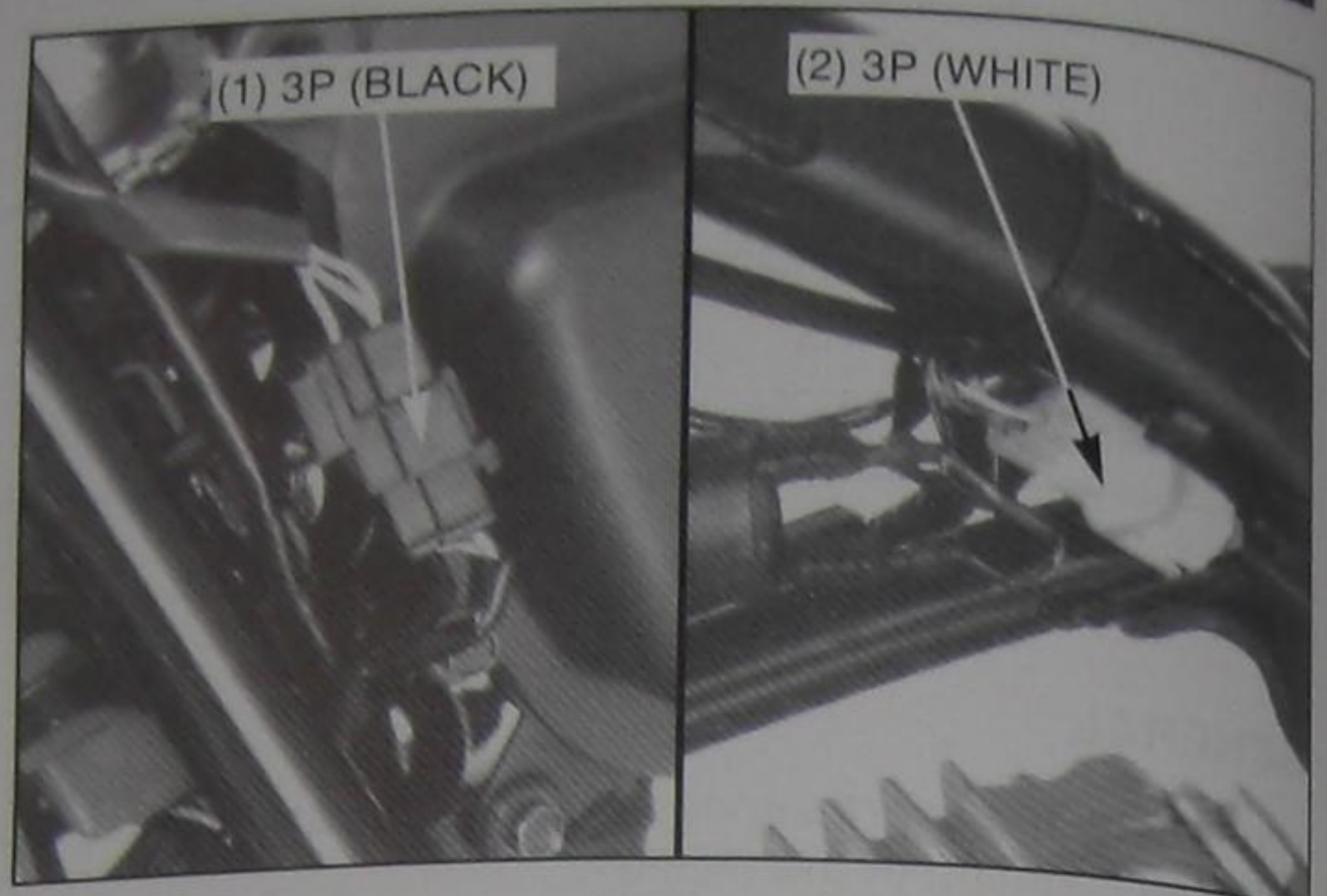
**Engine does not turn**
- Faulty starter clutch
- Damaged starter gears

## Alternator Stator

### LEFT CRANKCASE COVER REMOVAL

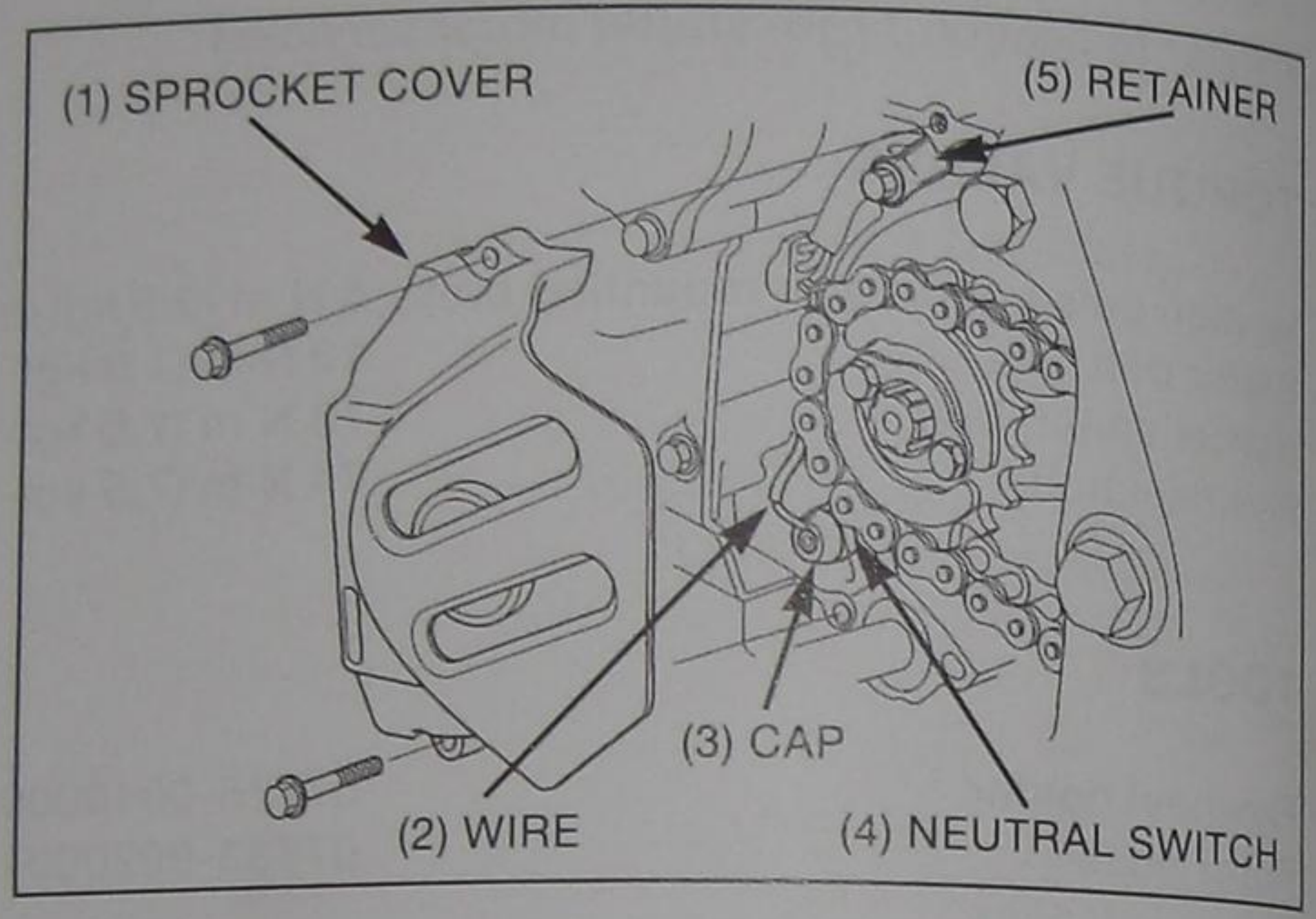
Remove the under guard (page 2-3).
Drain the engine oil (page 3-8).

Remove the side cover (page 2-3).
Remove the fuel tank (page 2-2).
Disconnect the alternator 3P (Black) and ignition pulse generator/neutral switch 3P (White) connectors.


(1) 3P (BLACK)
(2) 3P (WHITE)

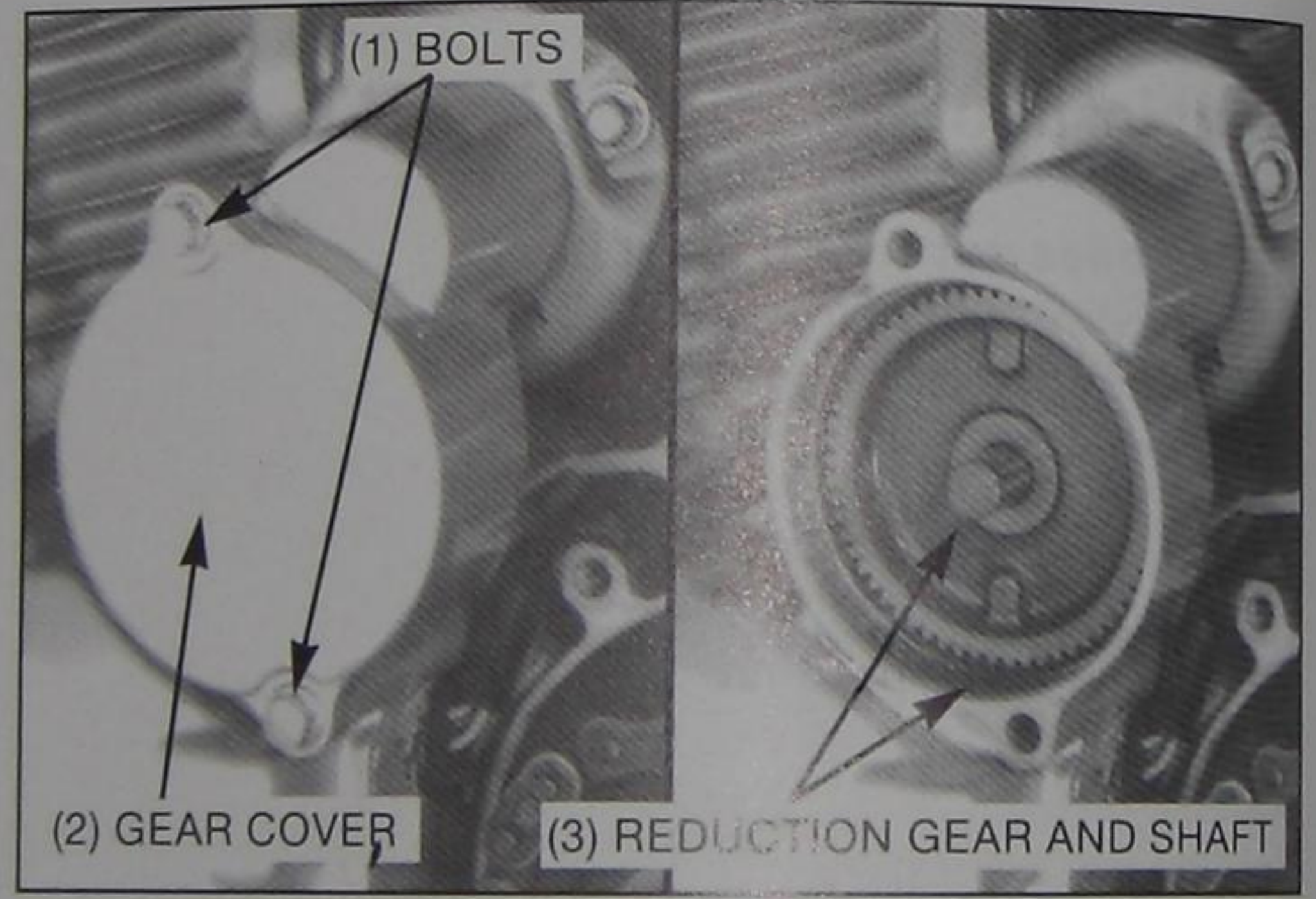
Remove the two bolts and the drive sprocket cover.

Remove the bolt and wire retainer.
Remove the cap from the neutral switch and disconnect the wire by pushing the terminal flange.

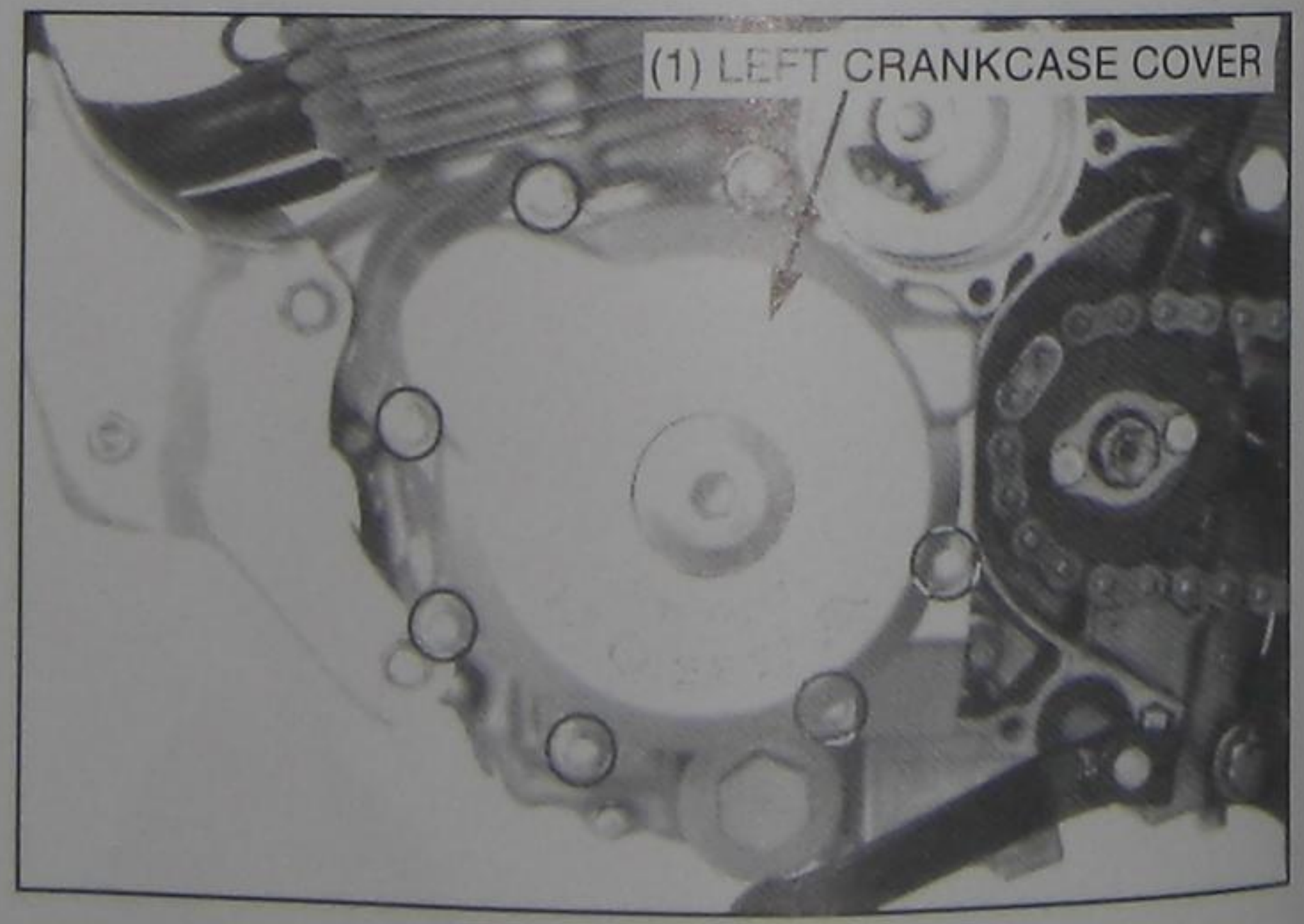

(1) SPROCKET COVER
(5) RETAINER
(3) CAP
(2) WIRE
(4) NEUTRAL SWITCH

Remove the two bolts and the reduction gear cover.

Pull the reduction gear shaft and remove the reduction gear.

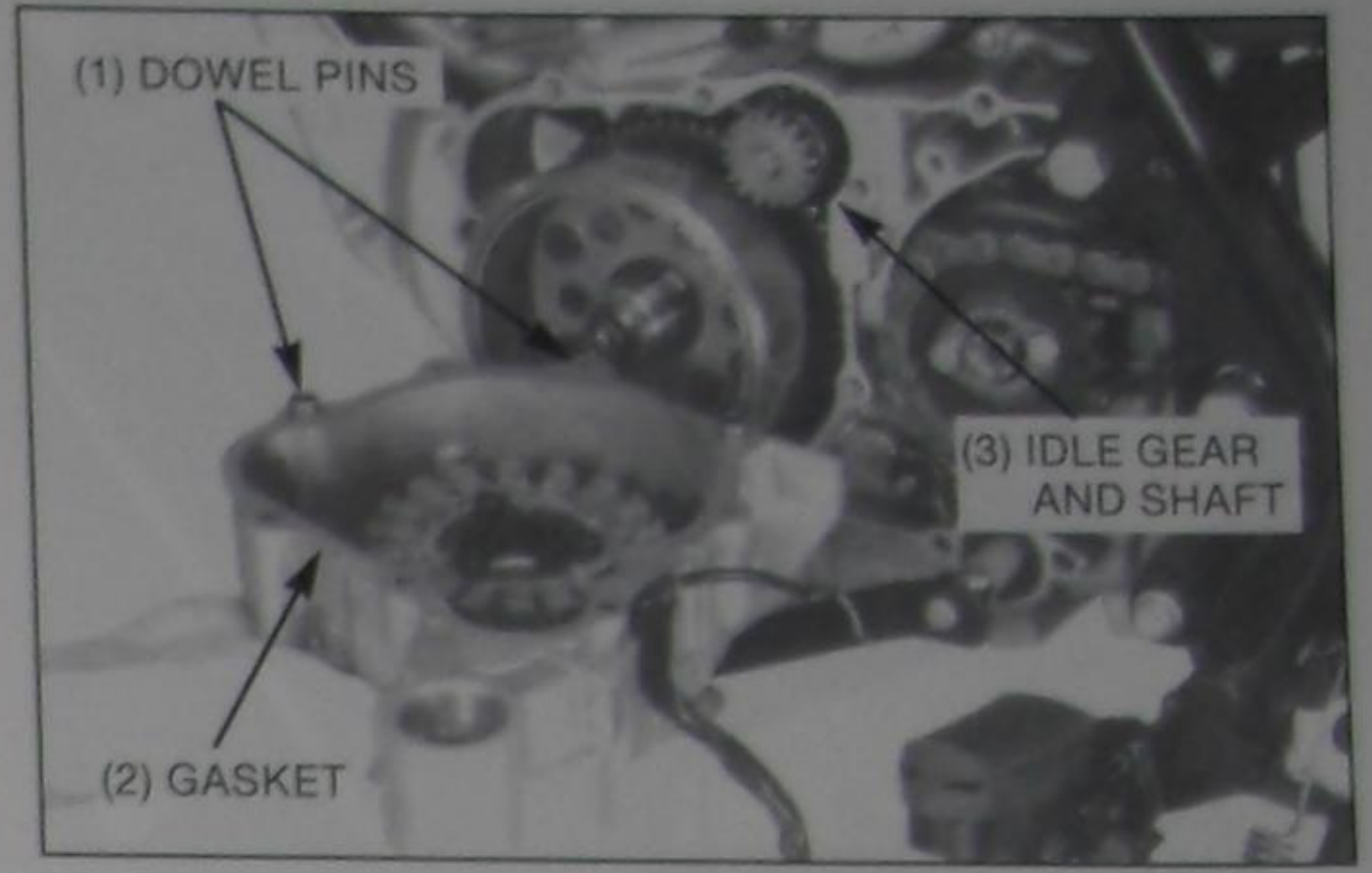

(1) BOLTS
(2) GEAR COVER
(3) REDUCTION GEAR AND SHAFT

Remove the seven crankcase cover bolts.
Remove the left crankcase cover.


(1) LEFT CRANKCASE COVER

Remove the reduction idle gear and shaft.

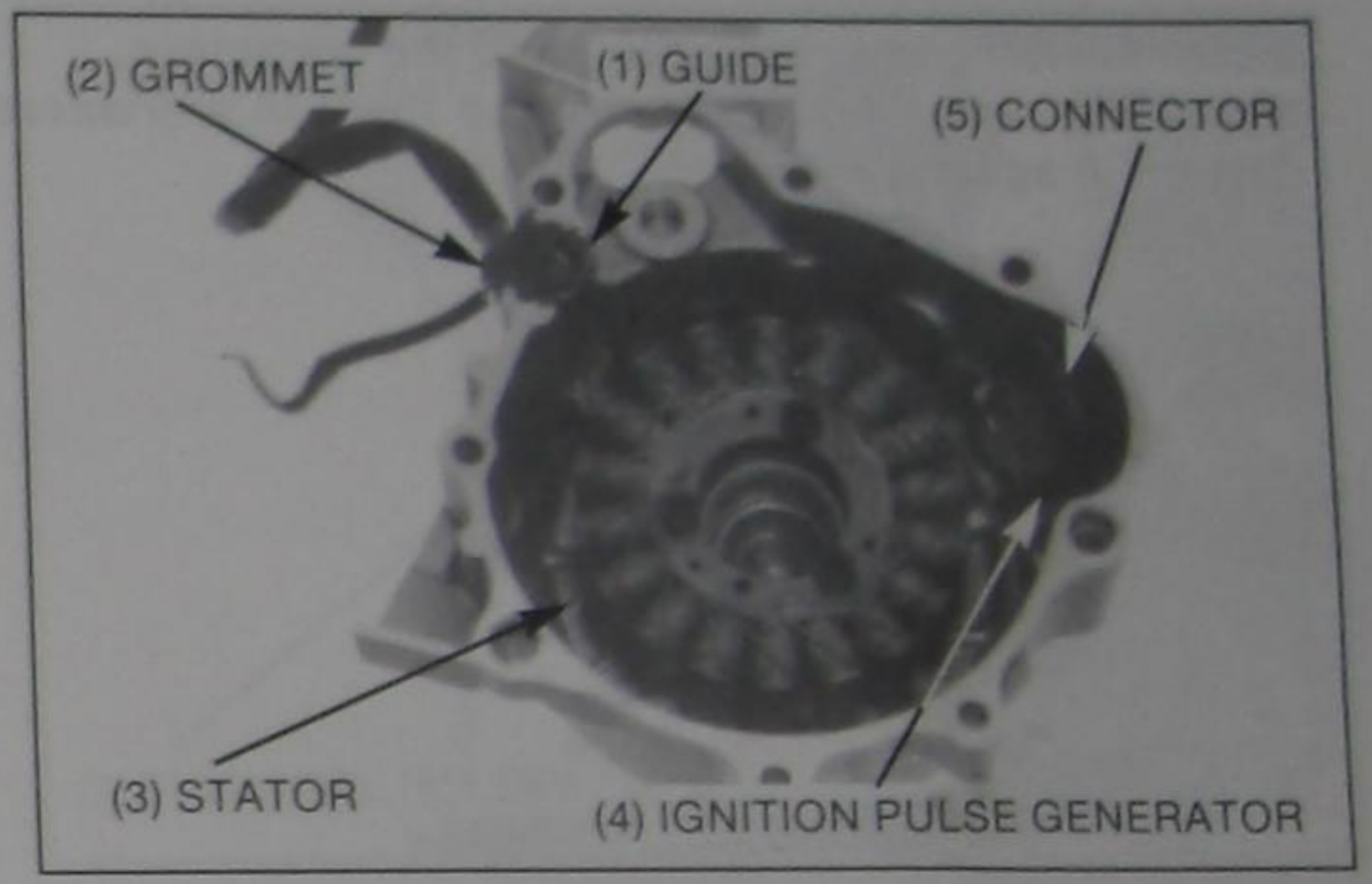
Remove the dowel pins and gasket.


(1) DOWEL PINS
(3) IDLE GEAR AND SHAFT
(2) GASKET

### STATOR/IGNITION PULSE GENERATOR REPLACEMENT

Disconnect the connector from the ignition pulse generator.
Remove the two bolts, wire retainer and ignition pulse generator from the crankcase cover.

Pull the wire guide out of the crankcase cover.
Remove the wire grommet.
Remove the three bolts and stator.

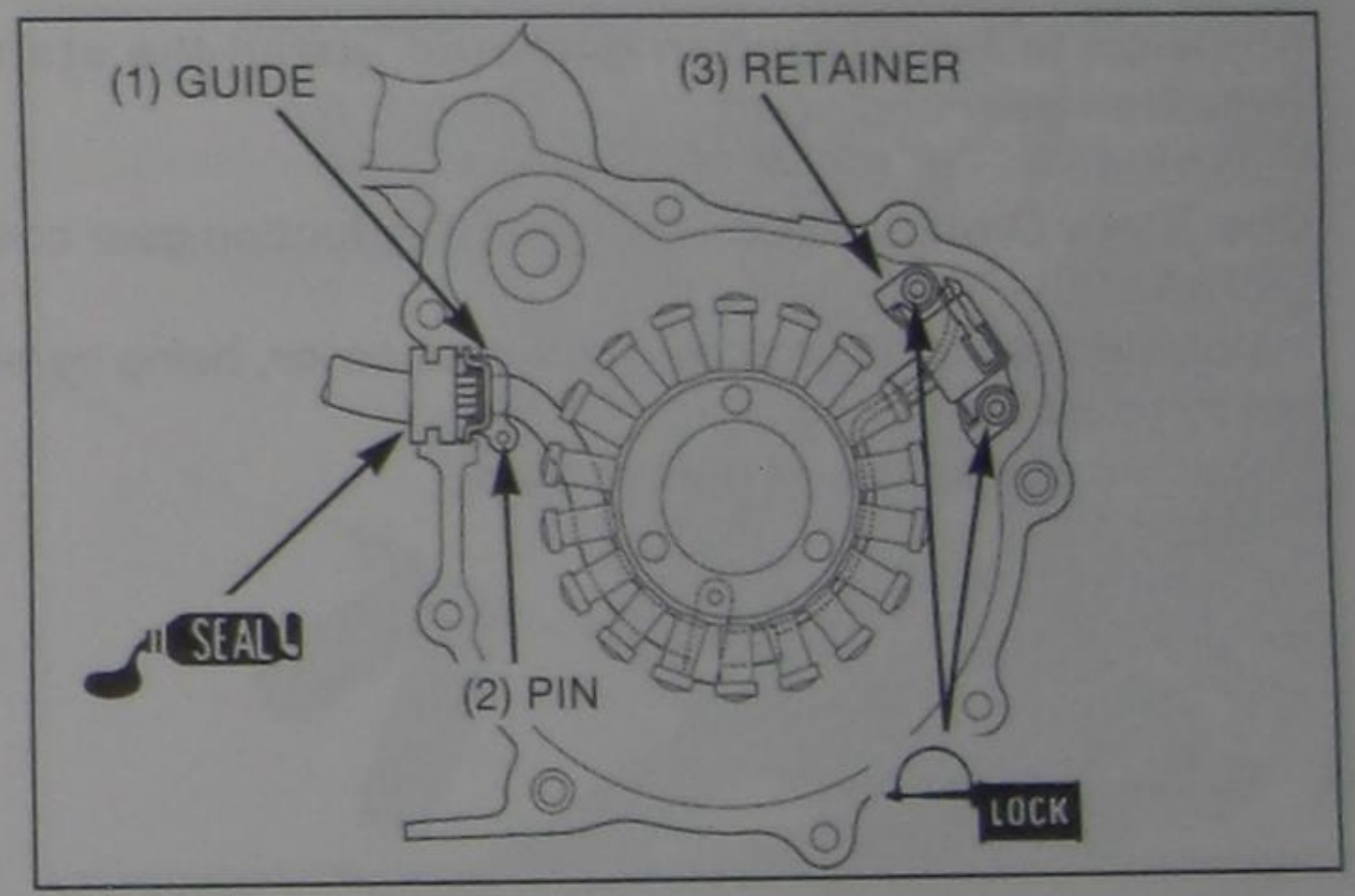

(2) GROMMET
(1) GUIDE
(5) CONNECTOR
(3) STATOR
(4) IGNITION PULSE GENERATOR

Install a new stator onto the crankcase cover with the three bolts.
Apply sealant to the grommet seating surface and install it into the cover groove properly.
Install the wire guide, aligning its hole with the case pin until it is fully seated.
Tighten the three bolts.

**TORQUE: 10 N·m (1.0 kgf-m, 7 lbf-ft)**

Apply locking agent to the pulse generator bolt threads.
Install the ignition pulse generator with the two bolts and wire retainer.
Tighten the two bolts.

**TORQUE: 5 N·m (0.5 kgf-m, 3.6 lbf-ft)**

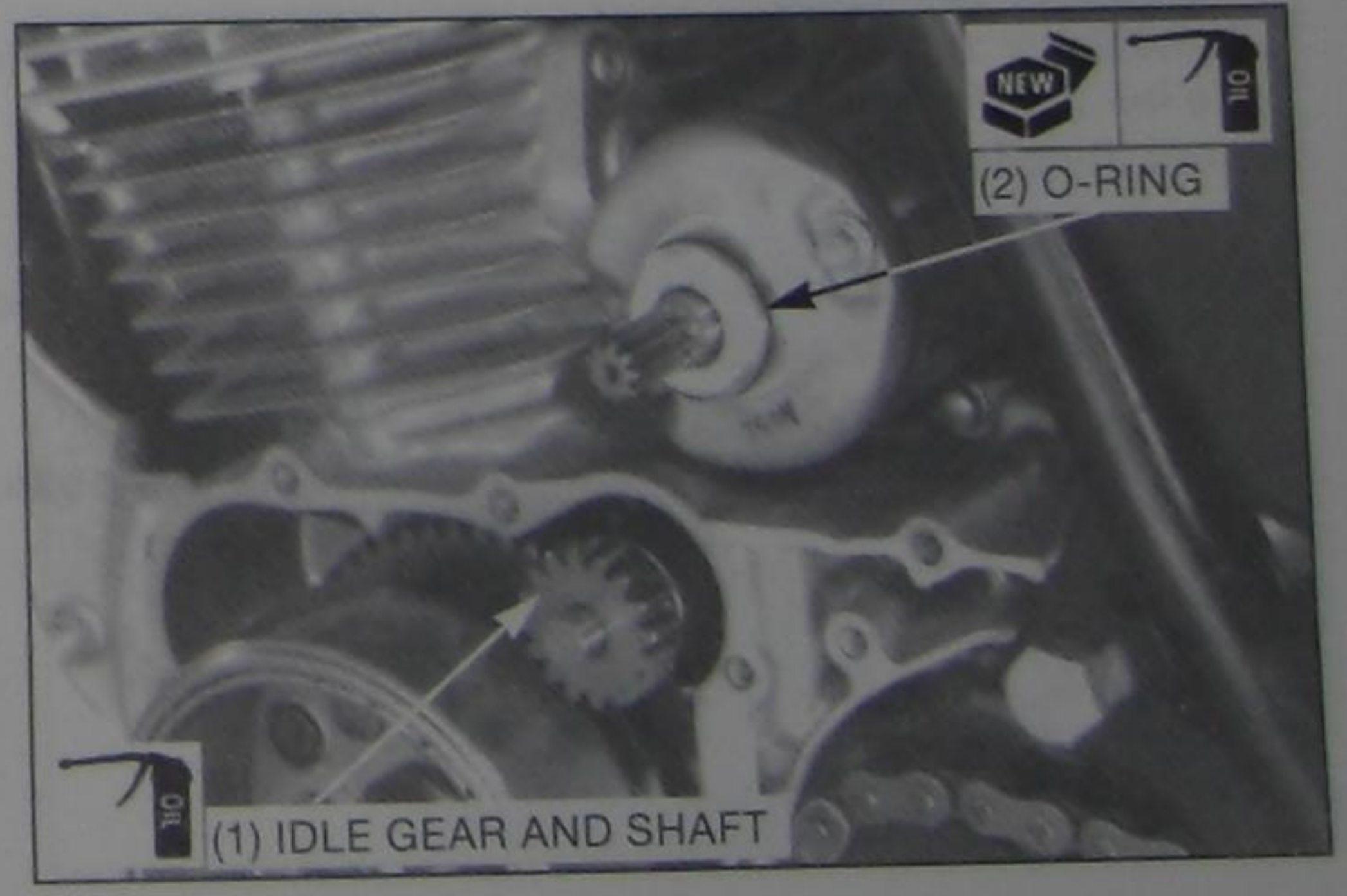

(1) GUIDE
(3) RETAINER
SEAL
(2) PIN
LOCK

### LEFT CRANKCASE COVER INSTALLATION

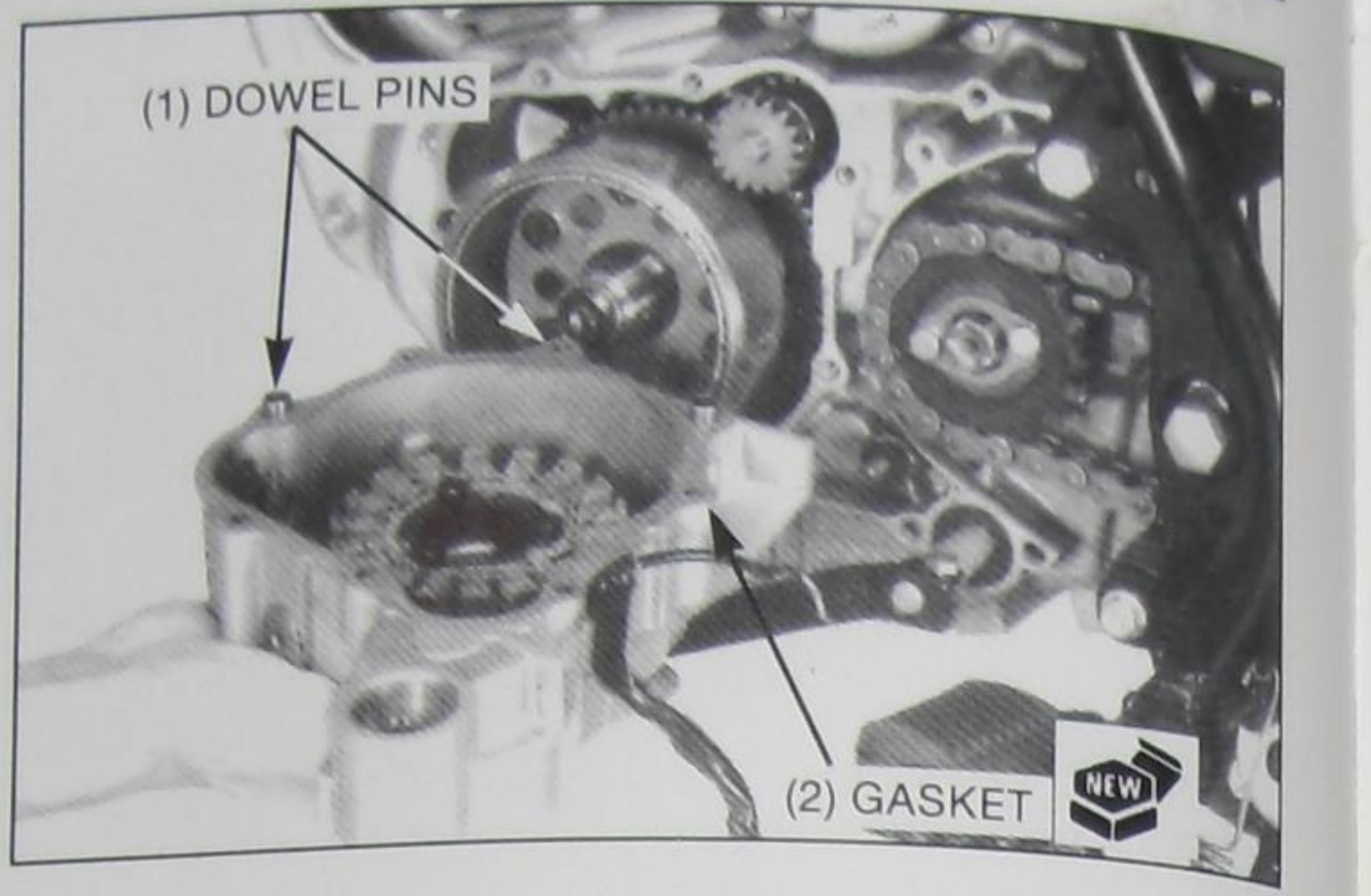
Clean the mating surfaces of the crankcase and cover.

Apply oil to the idle gear shaft and install the idle gear and shaft.

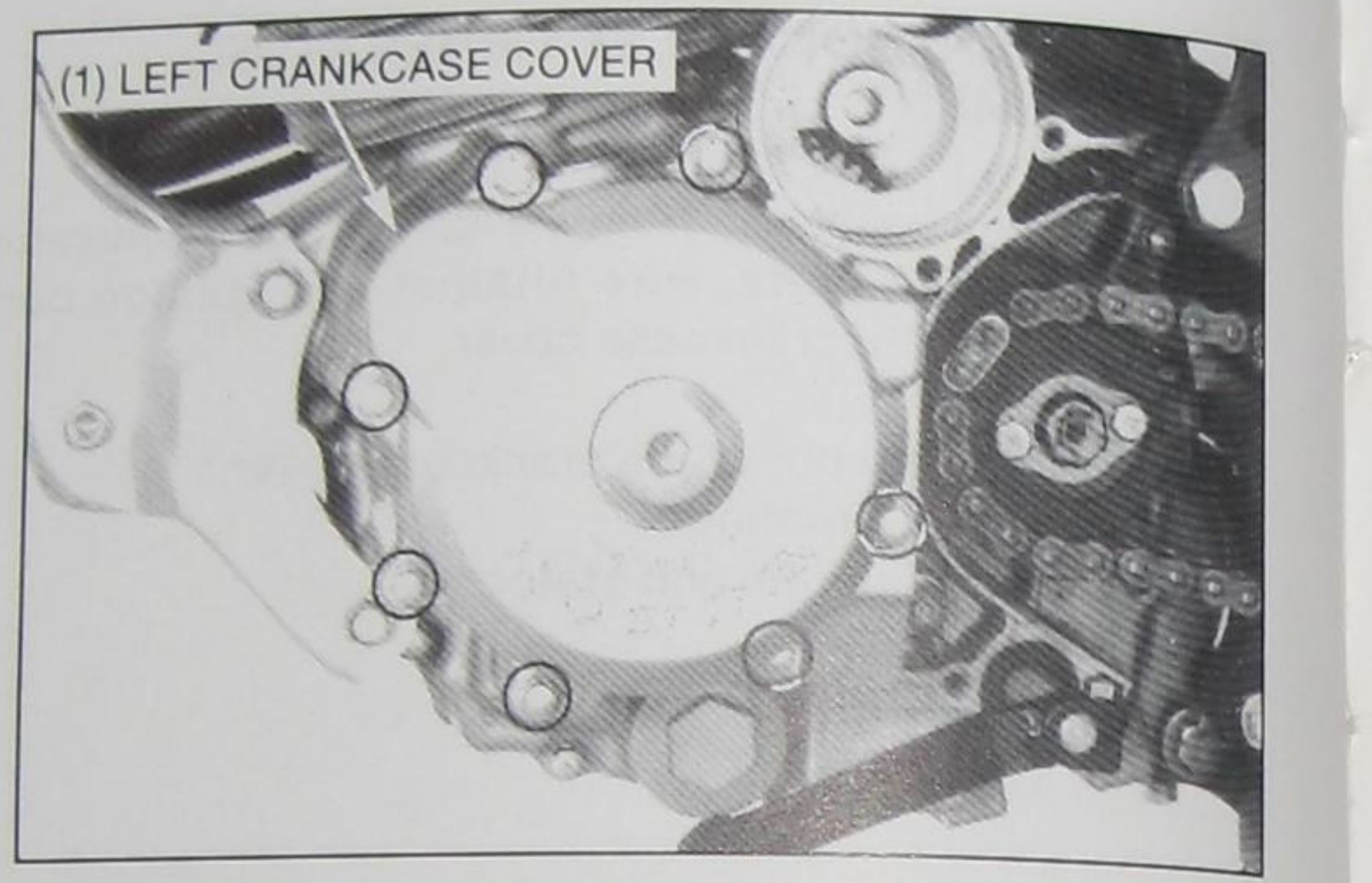
Coat a new O-ring with oil and install it into the starter motor groove.


NEW
(2) O-RING
(1) IDLE GEAR AND SHAFT

Install the dowel pins and a new gasket.

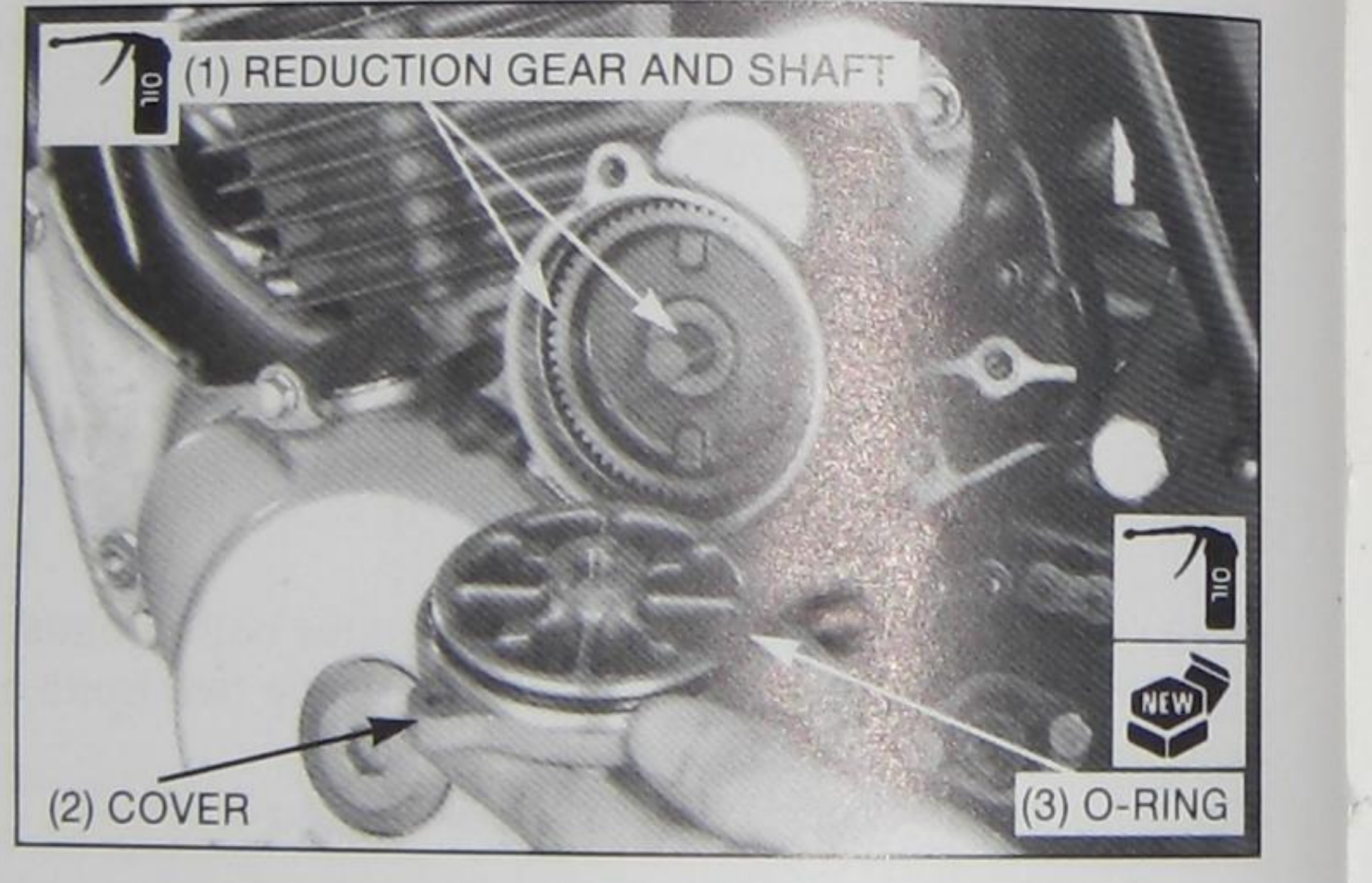

(1) DOWEL PINS
(2) GASKET
NEW

Install the left crankcase cover onto the crankcase.
Install the seven bolts and tighten them in a crisscross pattern in several steps.


(1) LEFT CRANKCASE COVER

Apply oil to the reduction gear and install the starter reduction gear and shaft.

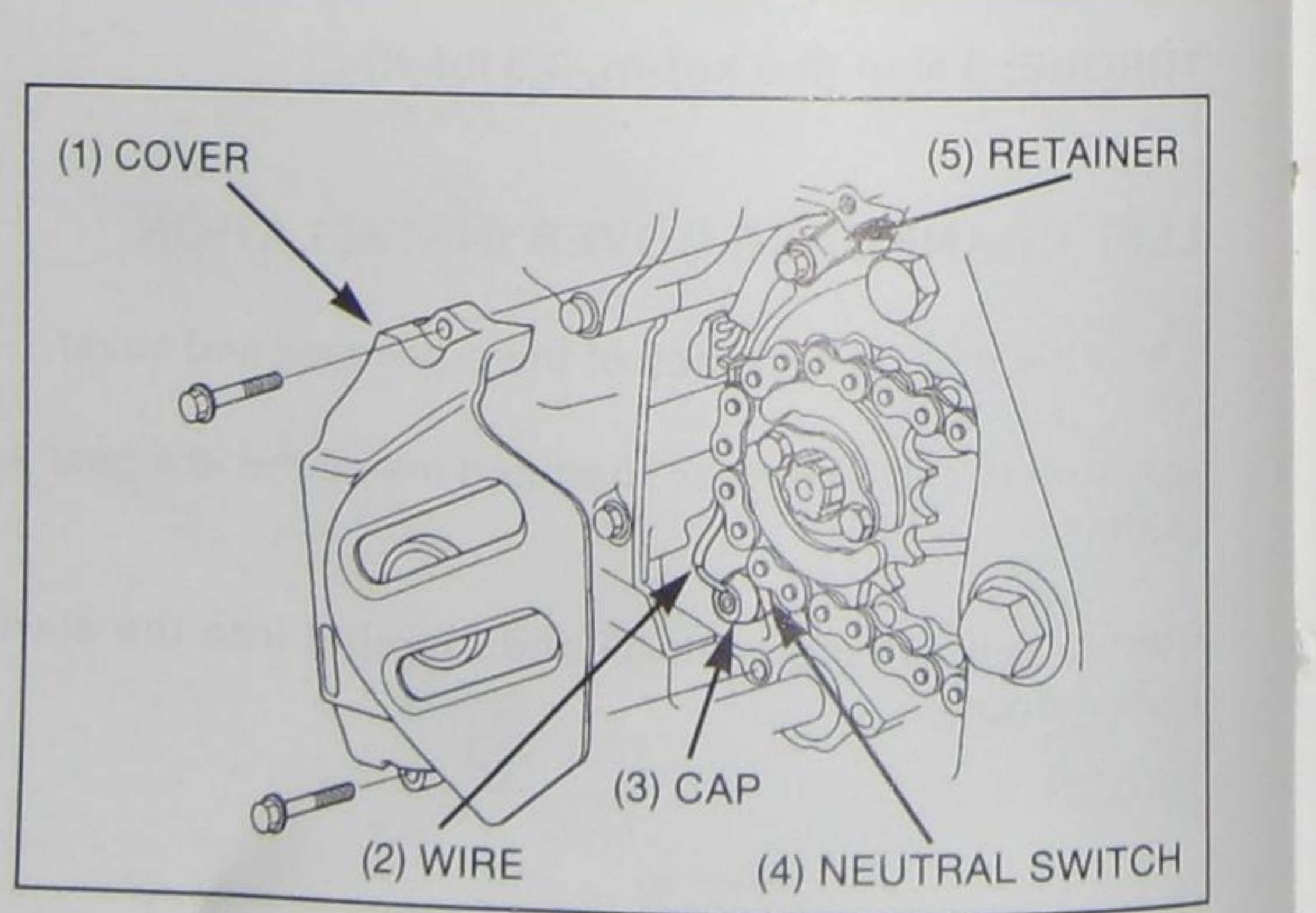
Coat a new O-ring with oil and install it reduction gear cover groove.
Install the gear cover onto the crankcase cover, being careful not to pinch the O-ring.
Install the two bolts and tighten them.


OIL
(1) REDUCTION GEAR AND SHAFT
OIL
NEW
(2) COVER
(3) O-RING

Connect the wire to the neutral switch through the terminal hole by `pushing the terminal flange.
Install the cap onto the switch securely.

Route the wire harness into the crankcase properly and install the wire retainer with the bolt (page 1-16).

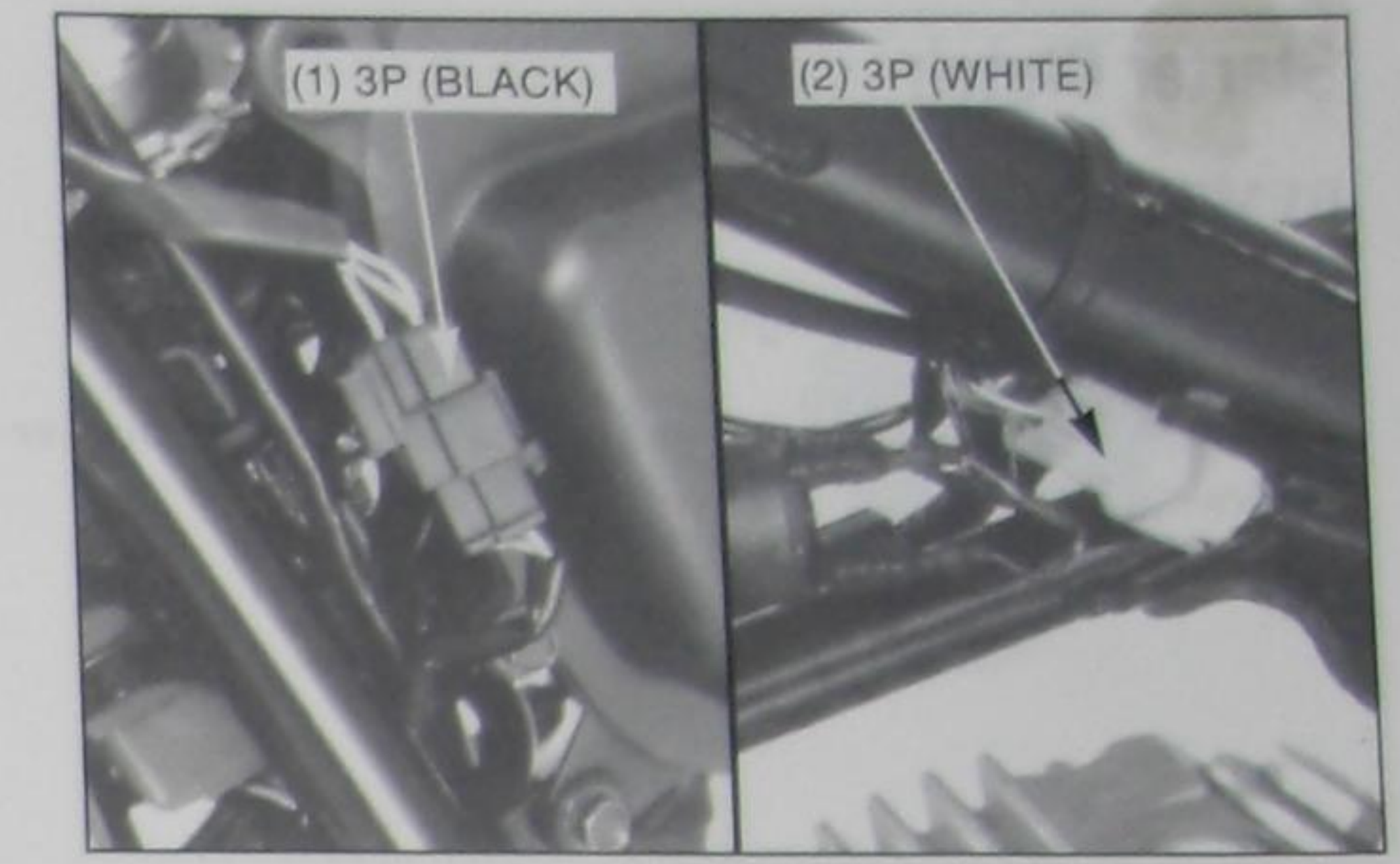
Install the drive sprocket cover and tighten the two bolts.


(1) COVER
(5) RETAINER
(3) CAP
(2) WIRE
(4) NEUTRAL SWITCH

Connect the alternator 3P (Black) and ignition pulse generator/neutral switch 3P (White) connectors.

Install the following:
- Fuel tank (page 2-3)
- Under guard (page 2-3)
- Side cover (page 2-3)

Fill the crankcase with engine oil (page 3-8).


(1) 3P (BLACK)
(2) 3P (WHITE)

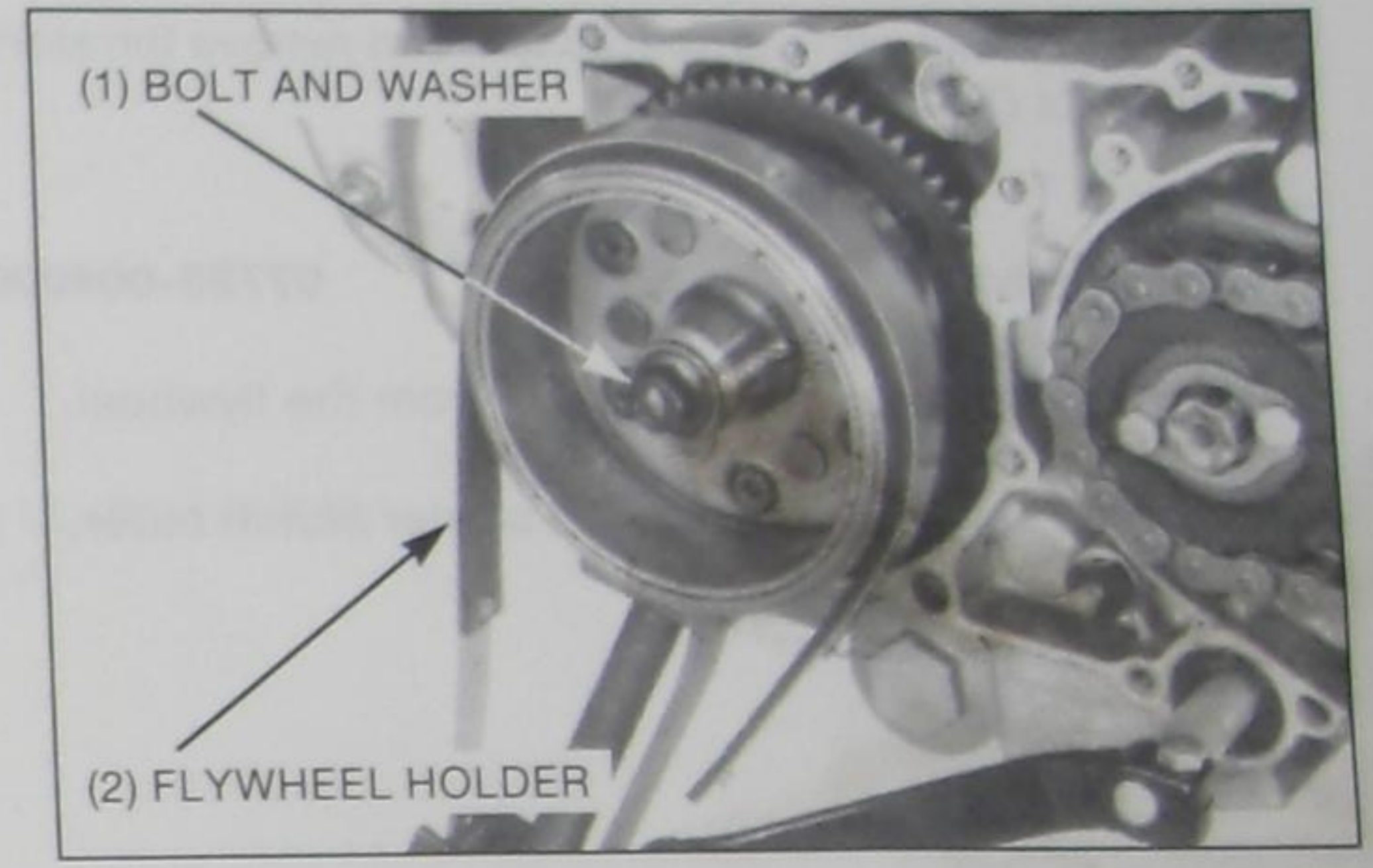
## Flywheel Removal

Remove the left crankcase cover (page 10-2).

Hold the flywheel with the special tool and loosen the flywheel bolt.

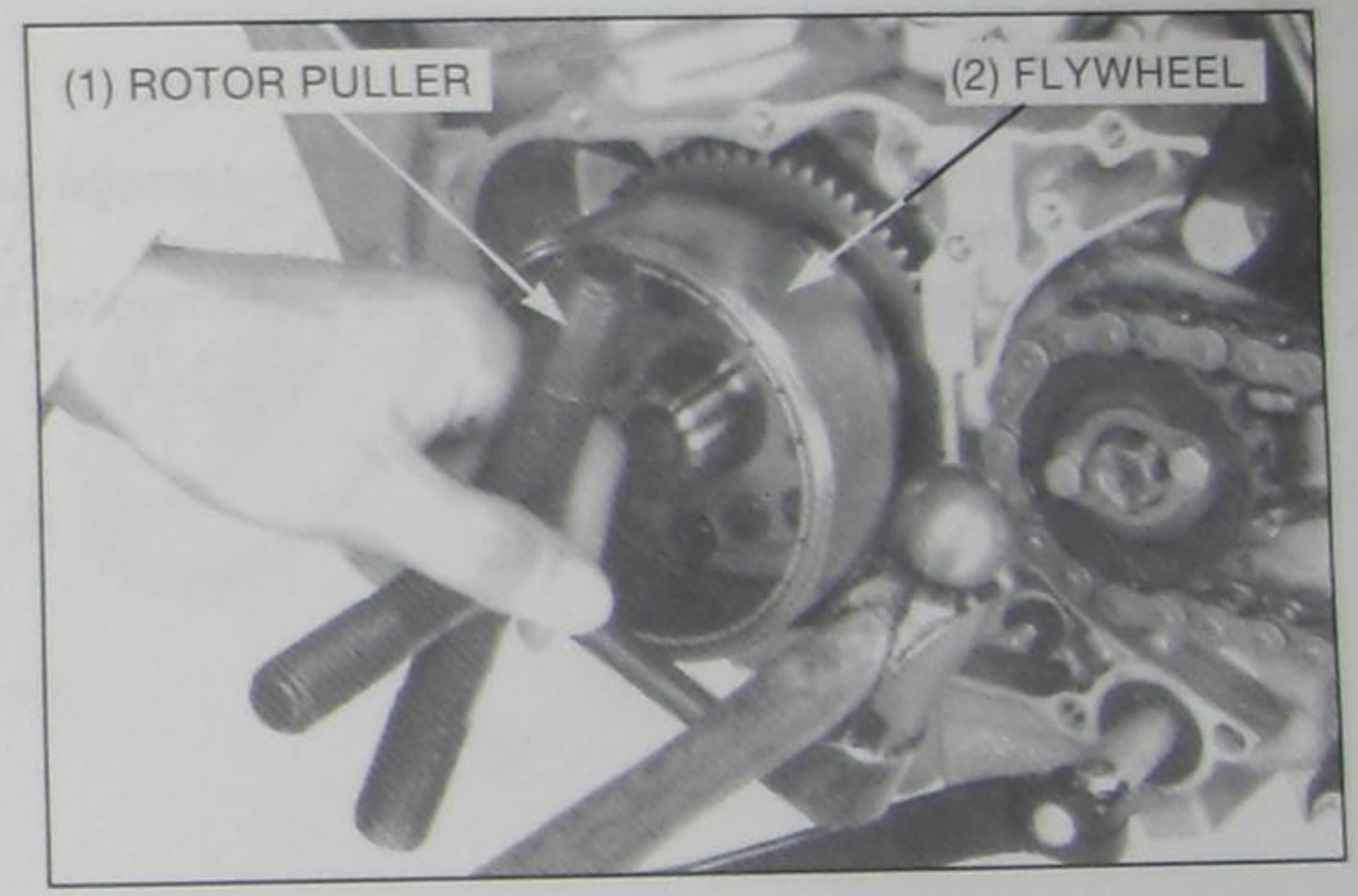
**TOOL:**
**Flywheel holder** **07725-0040000**

Remove the flywheel bolt and washer.

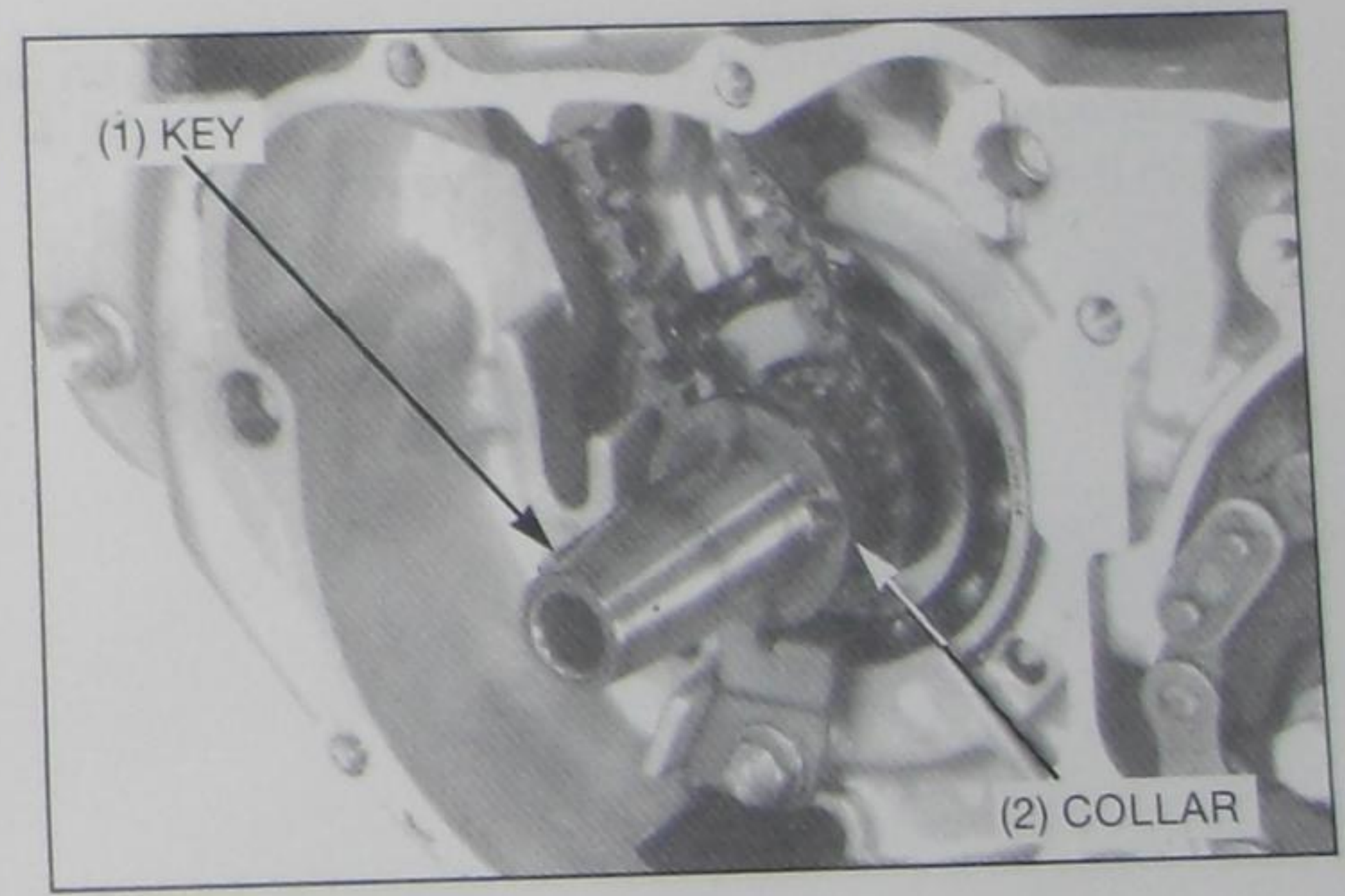

(1) BOLT AND WASHER
(2) FLYWHEEL HOLDER

Remove the flywheel using the special tool.

**TOOL:**
**Rotor puller** **07733-0020001**


(1) ROTOR PULLER
(2) FLYWHEEL

Remove the collar and the woodruff key from the crankshaft.

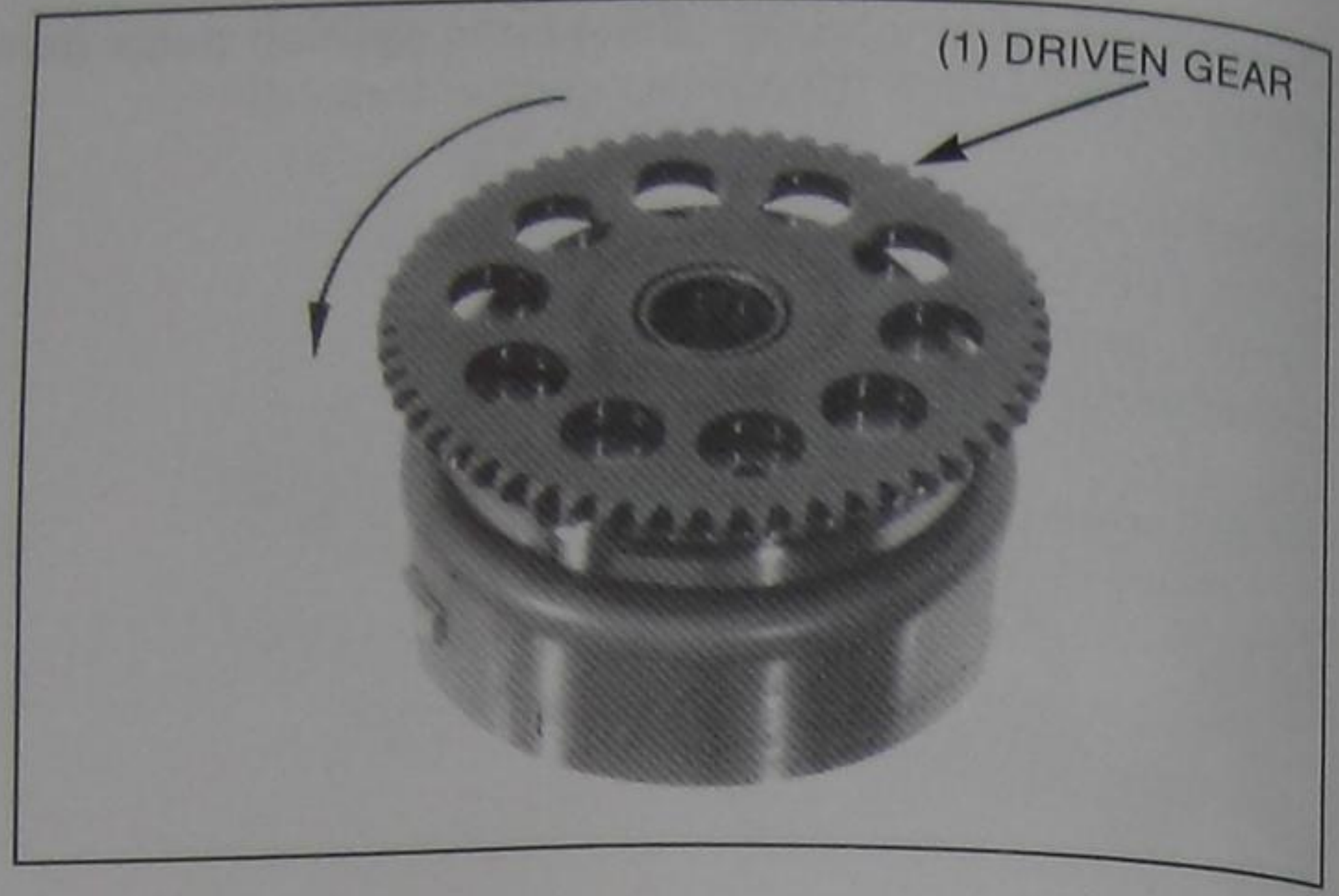

(1) KEY
(2) COLLAR

## Starter Clutch

### REMOVAL

Remove the flywheel (page 10-5).

Remove the starter driven gear while turning it counter-clockwise.

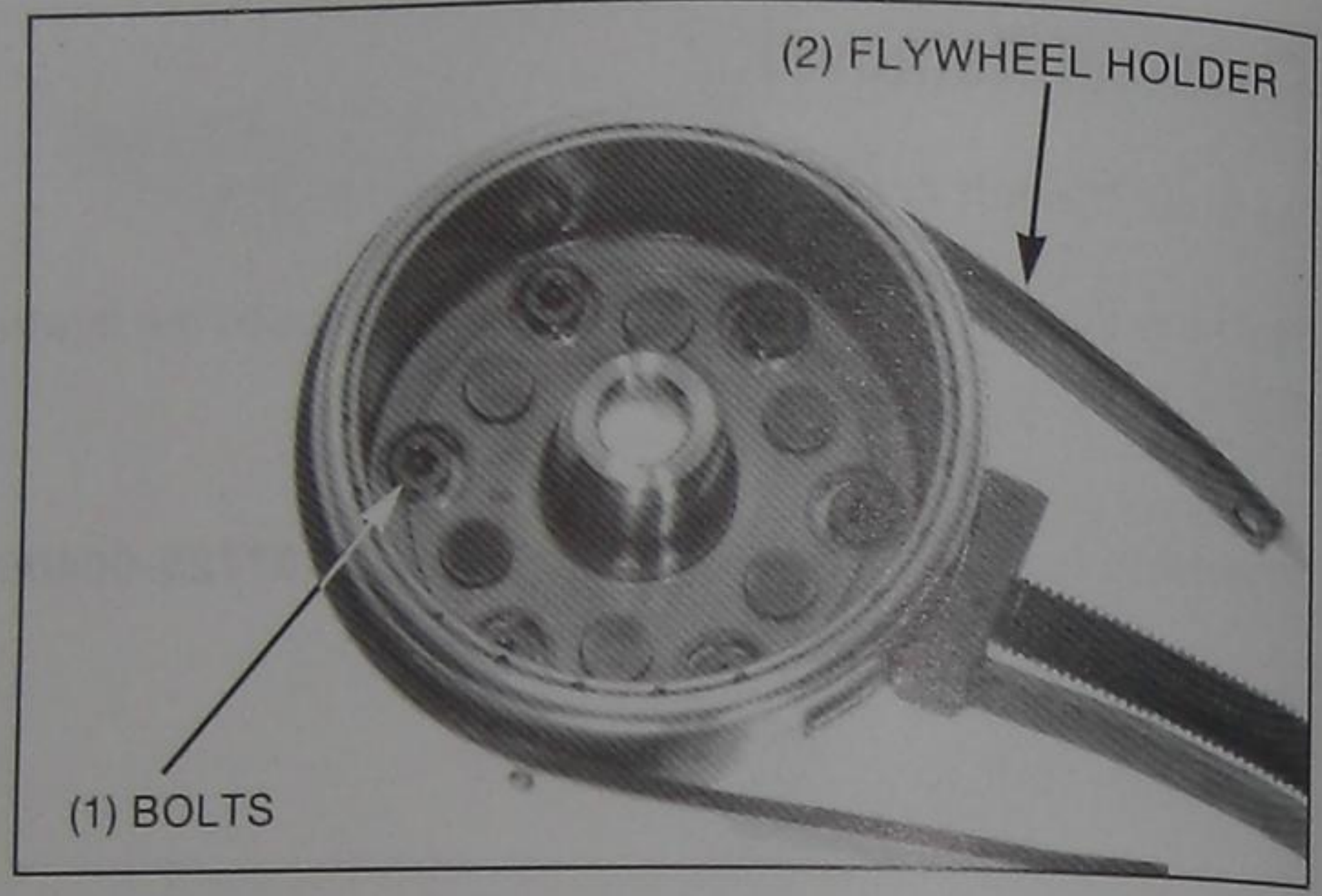

(1) DRIVEN GEAR

Hold the flywheel with the special tool and remove the starter clutch bolts (T30).

**TOOL:**
**Flywheel holder** **07725-0040000**

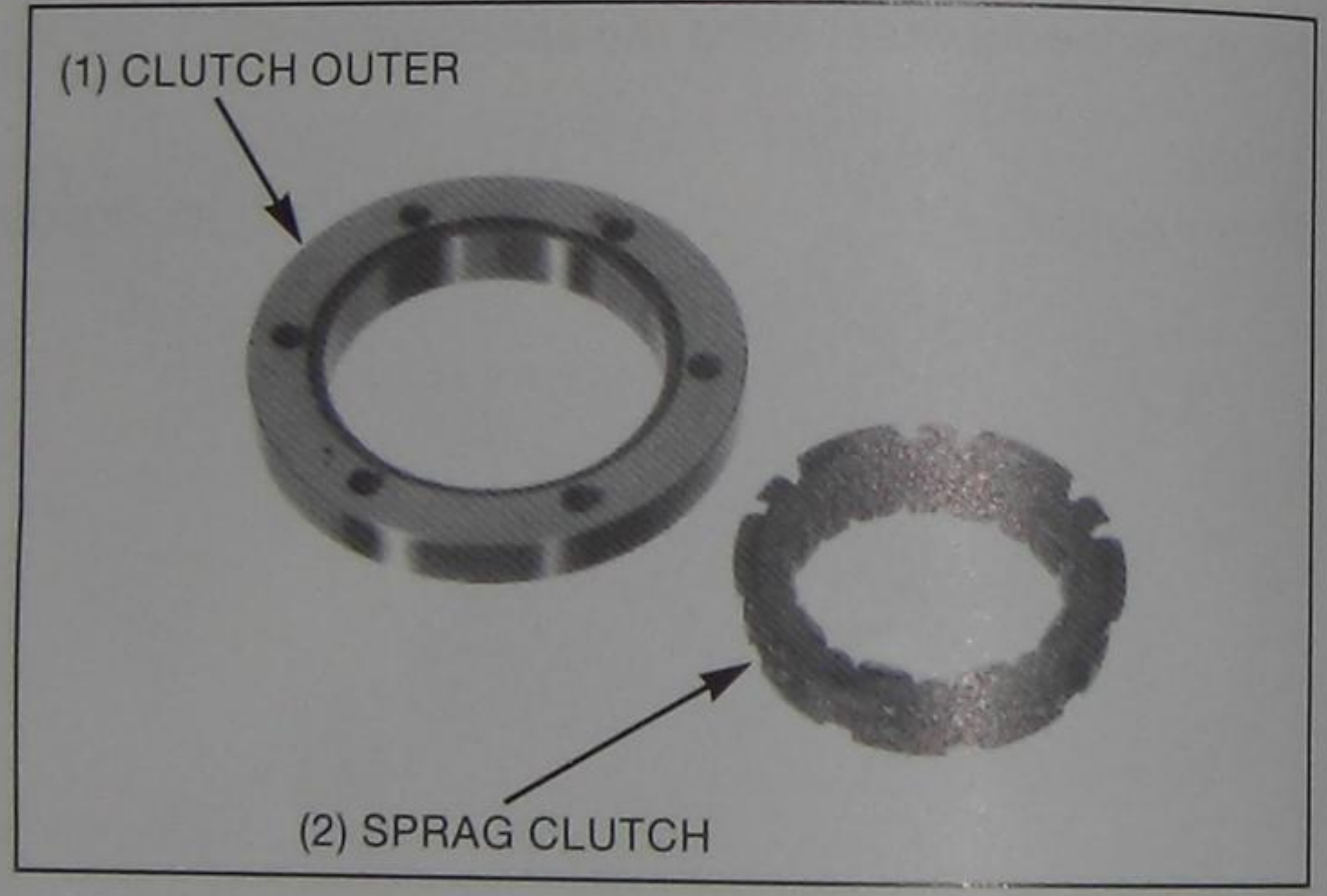
Remove the starter clutch assembly from the flywheel.

Remove the sprag clutch from the starter clutch outer.


(2) FLYWHEEL HOLDER
(1) BOLTS

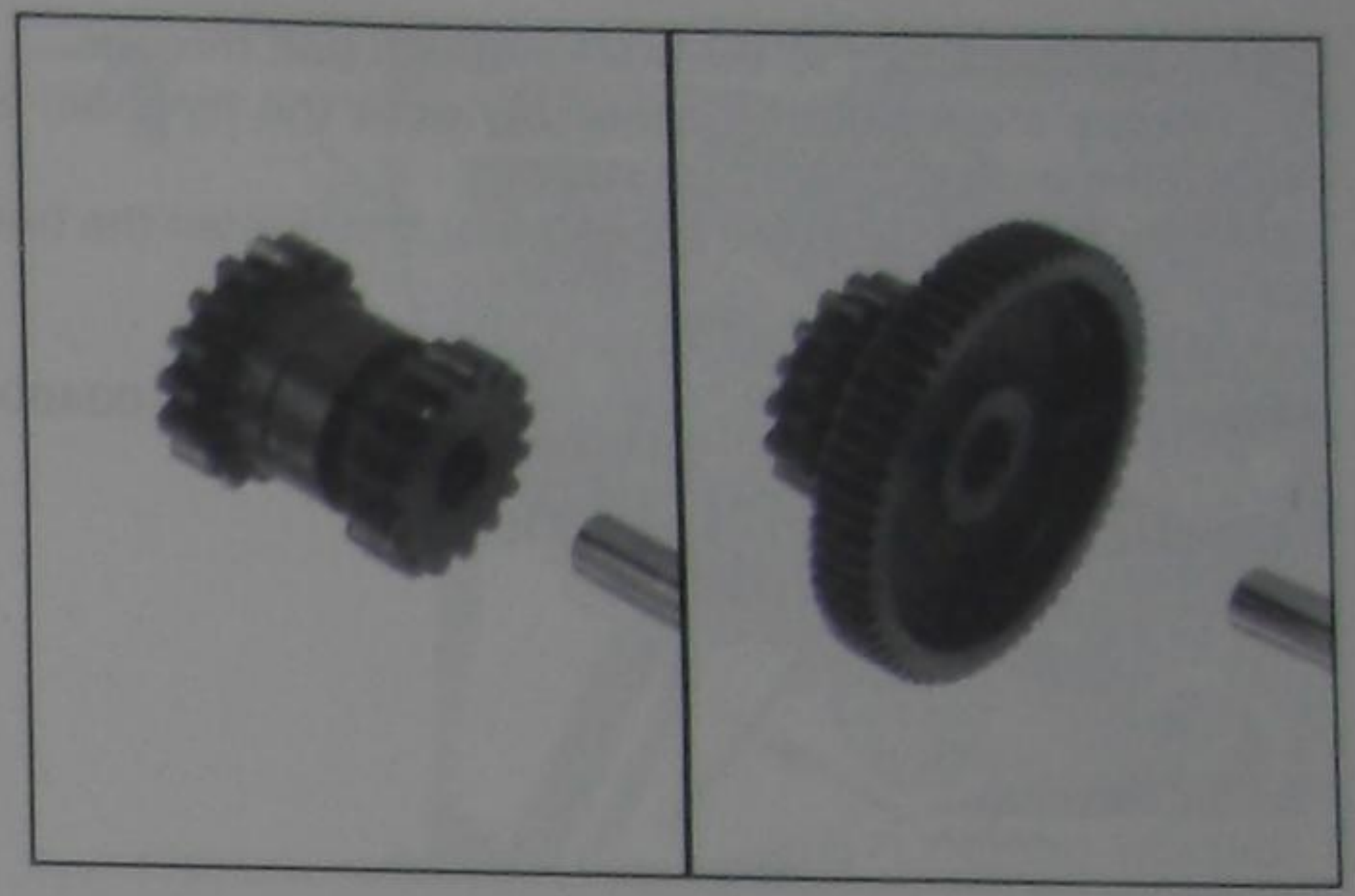
### INSPECTION

Check the sprag clutch for abnormal wear, damage and irregular movement.
Check the sprag contact furface of the clutch outer for damage.

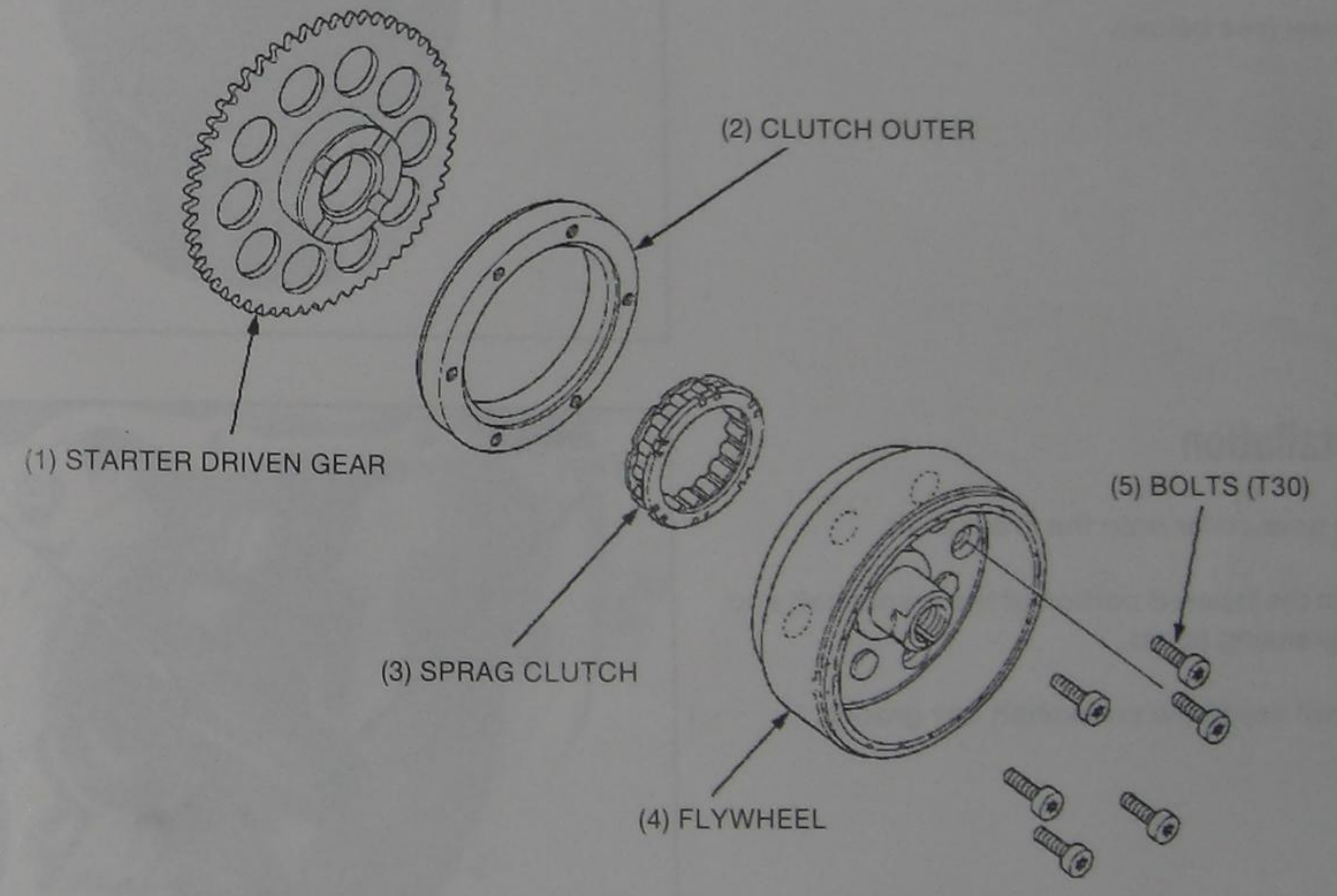

(1) CLUTCH OUTER
(2) SPRAG CLUTCH

Check the sprag contact surface of the starter driven gear for damage.
Check the teeth for damage excessive wear.

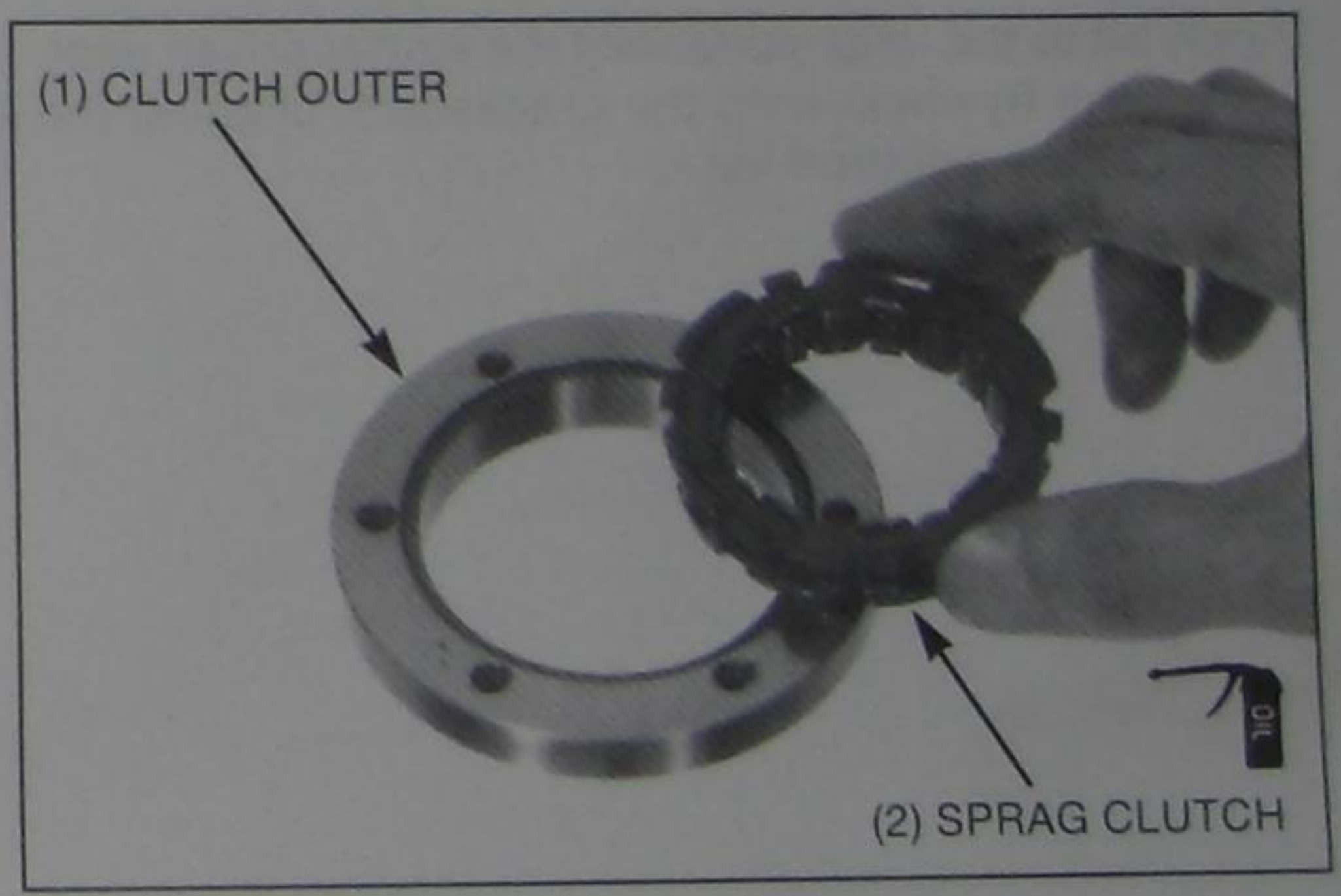
Check the idle and reduction gears for damage excessive wear.



### INSTALLATION


(2) CLUTCH OUTER
(1) STARTER DRIVEN GEAR
(5) BOLTS (T30)
(3) SPRAG CLUTCH
(4) FLYWHEEL

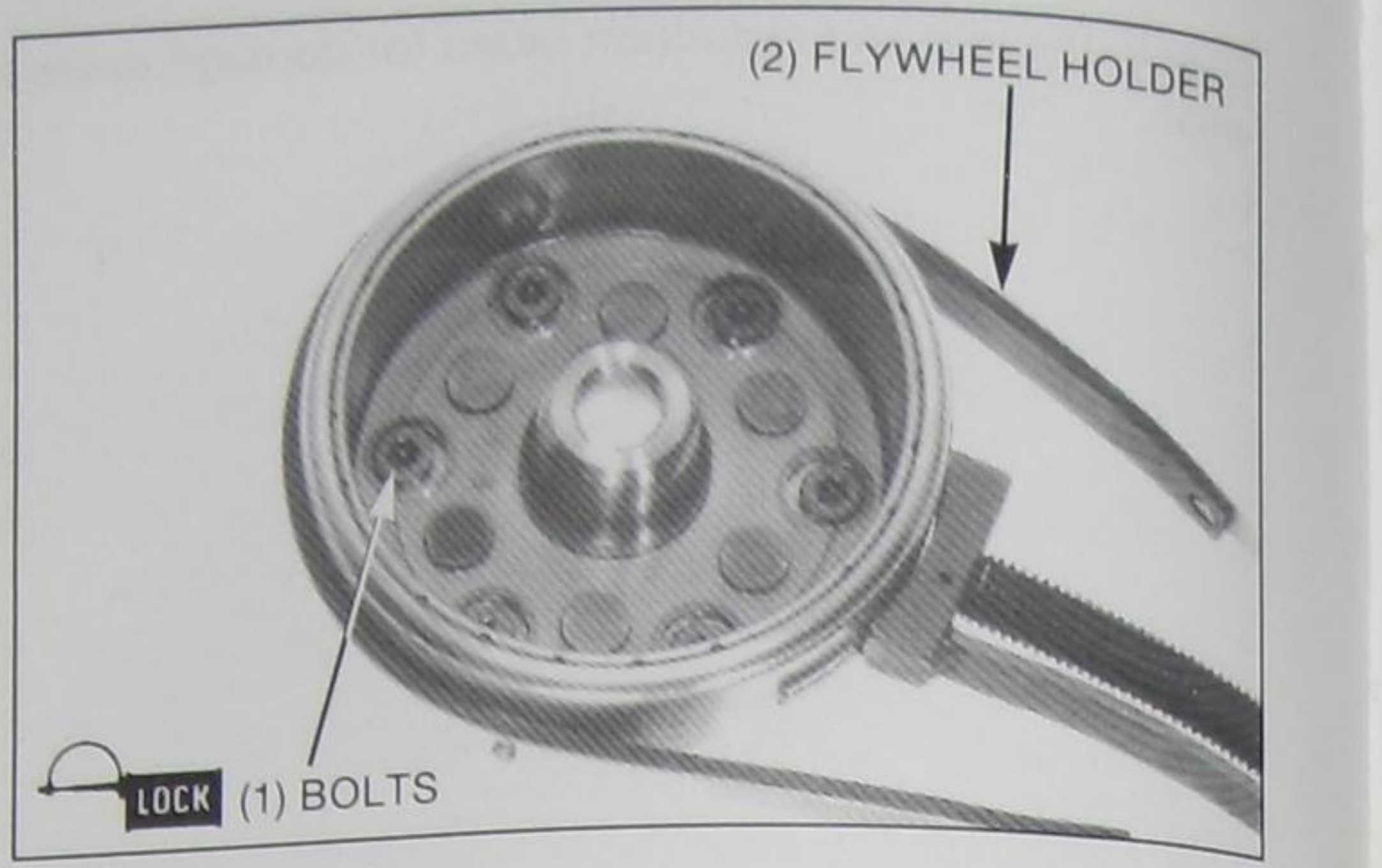
Apply oil to the sprag and install the sprag clutch into the clutch outer as shown.


(1) CLUTCH OUTER
(2) SPRAG CLUTCH

Apply locking agent to the starter clutch bolt threads.
Install the starter clutch assembly onto the flywheel and install the bolts.
Hold the flywheel with the special tool and tighten the bolts.

**TOOL:**
**Flywheel holder** **07725-0040000**

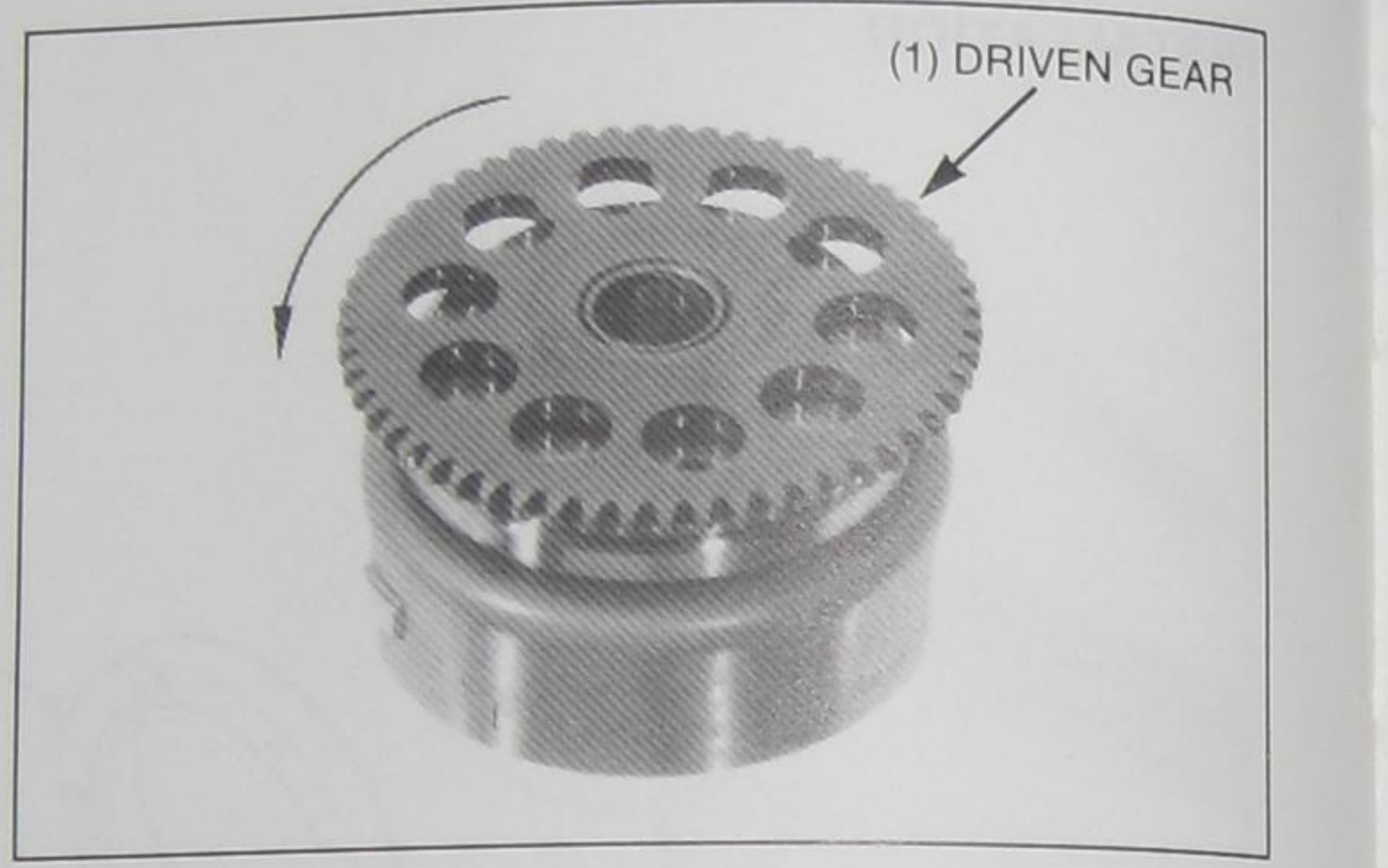
**TORQUE: 16 N·m (1.6 kgf-m, 12 lbf-ft)**


(2) FLYWHEEL HOLDER
LOCK
(1) BOLTS

Install the starter driven gear while turning it counterclockwise.

Make sure that the starter driven gear turns counterclockwise smoothly and does not turn clockwise.

Install the flywheel (see below).

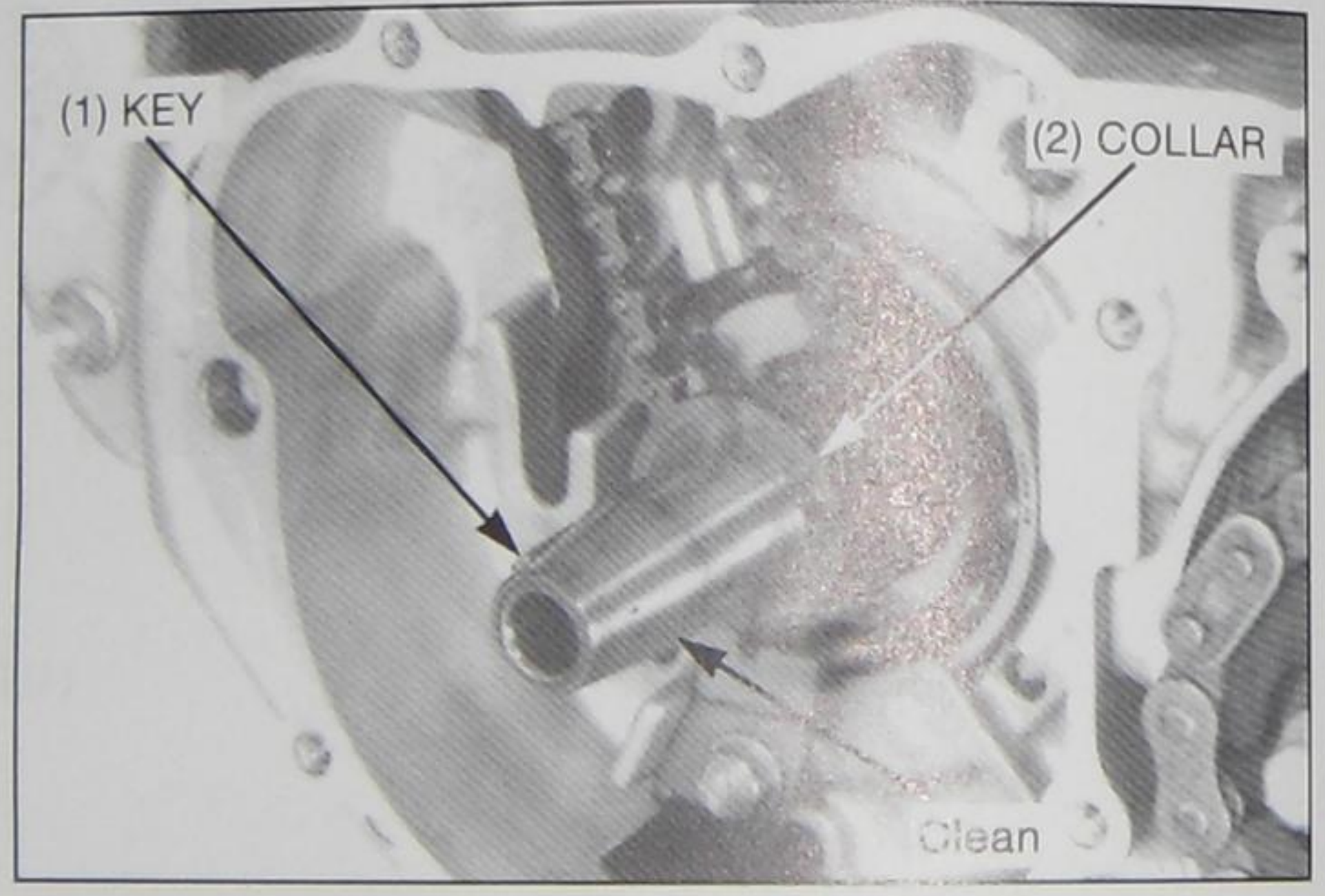

(1) DRIVEN GEAR

## Flywheel Installation

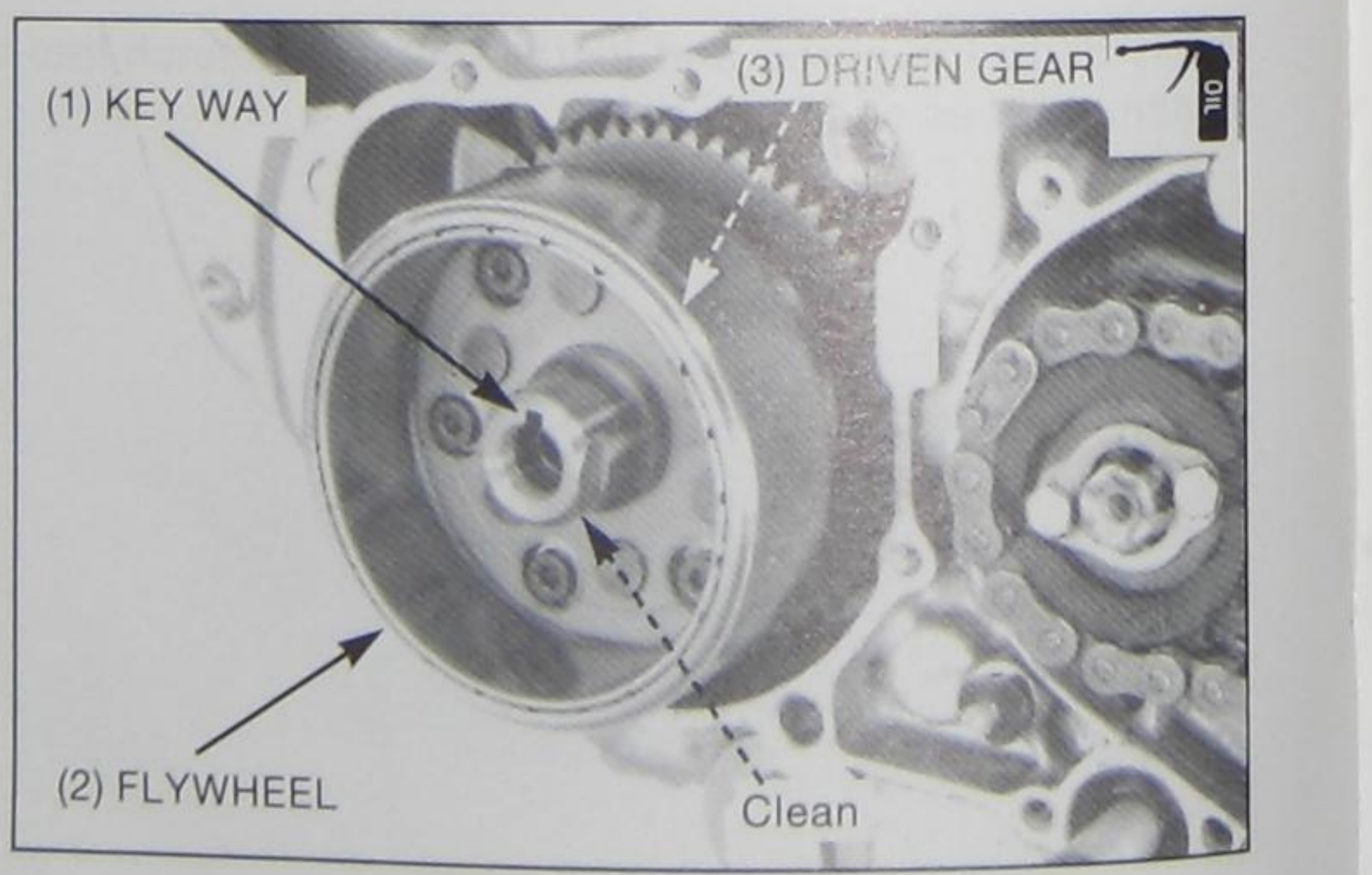
Install the driven gear collar onto the crankshaft.

Clean any oil from the tapered portion of the crankshaft and flywheel with degreasing agent.

Install the woodruff key in the crankshaft key groove.


(1) KEY
(2) COLLAR
Clean

Apply oil to the inner surface of the starter driven gear.
Install the flywheel onto the crankshaft, aligning the key way with the woodruff ket.

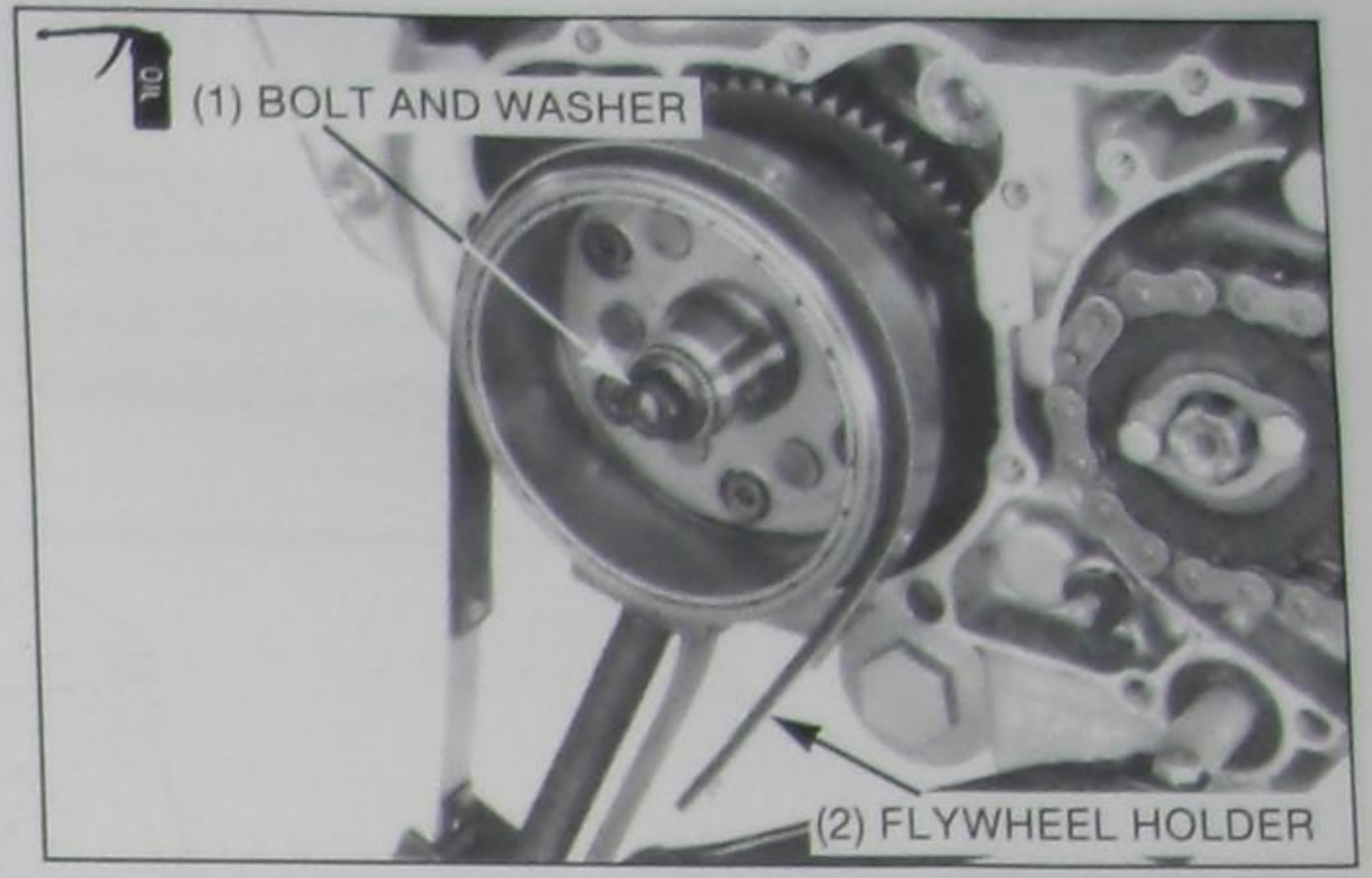

(1) KEY WAY
(3) DRIVEN GEAR
OIL
(2) FLYWHEEL
Clean

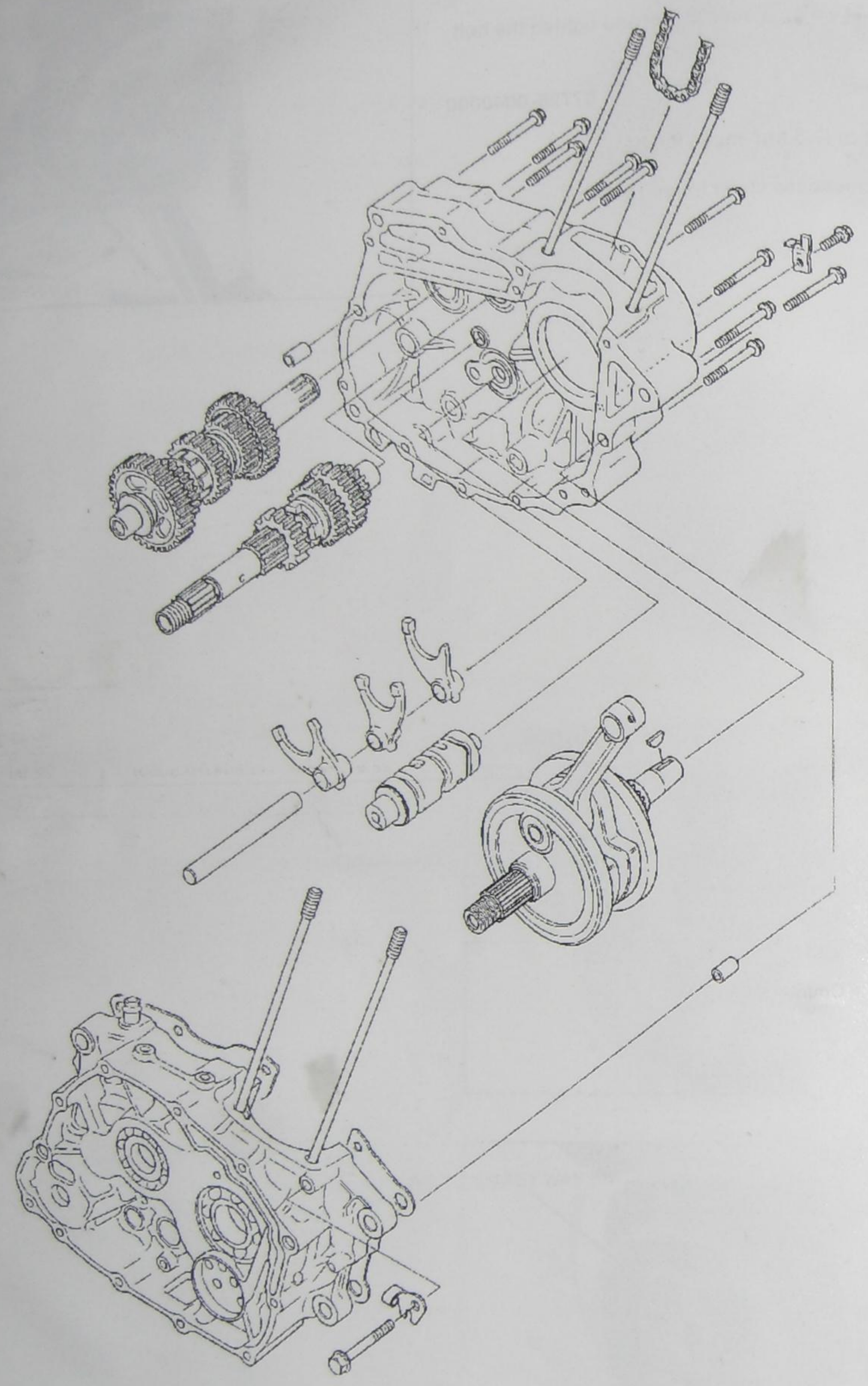
Apply oil to the flywheel bolt threads and seating surface.
Install the bolt and washer with the chamfered side of the washer facing out.
Hold the flywheel with the special tool and tighten the bolt.

**TOOL:**
**Flywheel holder** **07725-0040000**

**TORQUE: 74 N·m (7.5 kgf-m, 54 lbf-ft)**

Install the left crackcase cover (page 10-3).


OIL
(1) BOLT AND WASHER
(2) FLYWHEEL HOLDER



# 11. Crankcase/Transmission/Crankshaft

SERVICE INFORMATION 11-1
TROUBLESHOOTING 11-2
CRANKCASE SEPARATION 11-3
TRANSMISSION 11-4
CRANKSHAFT 11-8
CRANKCASE BEARING REPLACEMENT 11-9
CRANKCASE ASSEMBLY 11-11

## Service Information

### GENERAL

- The crankcase halves must be separated to service the transmission and crankshaft. To service these parts, the engine must be removed from the frame (section 6).
- Be careful not to damage the crankcase mating surfaces when servicing.

### SPECIFICATIONS

Unit: mm (in)

| Item | | | Standard | Service Limit |
|---|---|---|---|---|
| Shift fork | I.D. | | 12.000-12.018 (0.4724-0.4731) | 12.05 (0.474) |
| | Claw thickness | | 4.93-5.00 (0.194-0.197) | 4.70 (0.185) |
| | Shaft O.D. | | 11.976-11.994 (0.4715-0.4722) | 11.90 (0.469) |
| Transmission | Gear I.D. | M3, C4 | 20.020-20.041 (0.7882-0.7890) | 20.07 (0.790) |
| | | M5, C2 | 23.020-23.041 (0.9063-0.9071) | 23.07 (0.908) |
| | | C1 | 19.520-19.541 (0.7685-0.7693) | 19.57 (0.770) |
| | Bushing O.D. | M5 | 22.984-23.005 (0.9049-0.9057) | 22.93 (0.903) |
| | | C1 | 19.479-19.500 (0.7667-0.7677) | 19.43 (0.765) |
| | | C2 | 22.979-23.000 (0.9047-0.9055) | 22.93 (0.903) |
| | Bushing I.D. | M5 | 20.020-20.041 (0.7882-0.7890) | 20.10 (0.791) |
| | | C1 | 16.516-16.534 (0.6502-0.6509) | 16.60 (0.654) |
| | | C2 | 20.000-20.021 (0.7874-07882) | 20.10 (0.791) |
| | Gear-to-bushing clearance | M5 | 0.015-0.057 (0.0006-0.0022) | 0.10 (0.004) |
| | | C1, C2 | 0.020-0.062 (0.0008-0.0024) | 0.10 (0.004) |
| | Mainshaft O.D. | At M3, M5 | 19.959-19.980 (0.7875-0.7866) | 19.91 (0.784) |
| | Countershaft O.D. | At C1 bushing | 16.466-16.484 (0.6483-0.6490) | 16.41 (0.646) |
| | | At C2 bushing | 19.974-19.987 (0.7864-0.7869) | 19.91 (0.784) |
| | | At C4 gear | 19.959-19.980 (0.7875-0.7866) | 19.91 (0.784) |
| | Gear-to-shaft clearance | M3, C4 | 0.040-0.082 (0.0016-0.0032) | 0.111 (0.0044) |
| | Bushing-to-shaft clearance | M5 | 0.040-0.082 (0.0016-0.0032) | 0.111 (0.0044) |
| | | C1 | 0.032-0.068 (0.0013-0.0027) | 0.096 (0.0038) |
| | | C2 | 0.013-0.047 (0.0005-0.0019) | 0.10 (0.004) |
| Crankshaft | Runout | | — | 0.10 (0.004) |
| | Big end side clearance | | 0.05-0.30 (0.002-0.012) | 0.5 (0.02) |
| | Big end radial clearance | | 0-0.008 (0-0.0003) | 0.05 (0.002) |

**TORQUE VALUES**

| | | |
|---|---|---|
| Mainshaft bearing setting plate bolt | 12 N·m (1.2 kgf-m, 9 lbf-ft) | Apply locking agent to the threads. |

**TOOLS**

| | |
|---|---|
| Driver | 07749-0010000 |
| Attachment, 32 x 35 mm | 07746-0010100 |
| Attachment, 42 x 47 mm | 07746-0010300 |
| Attachment, 52 x 55 mm | 07746-0010400 |
| Attachment, 72 x 75 mm | 07746-0010600 |
| Pilot, 15 mm | 07746-0040300 |
| Pilot, 20 mm | 07746-0040500 |
| Pilot, 28 mm | 07746-0041100 |
| Bearing remover set, 15 mm | 07936-KC10000 |
| - Remover shaft | 07936-KC10100 |
| - Remover head | 07936-KC10200 |
| - Sliding weight | 07741-0010201 |

## Troubleshooting

**Excessive engine noise**

- Worn connecting rod big end bearing
- Worn crankshaft main journal bearing
- Worn or damaged transmission gears
- Worn or damaged transmission bearing

**Transmission jumps out of gear**

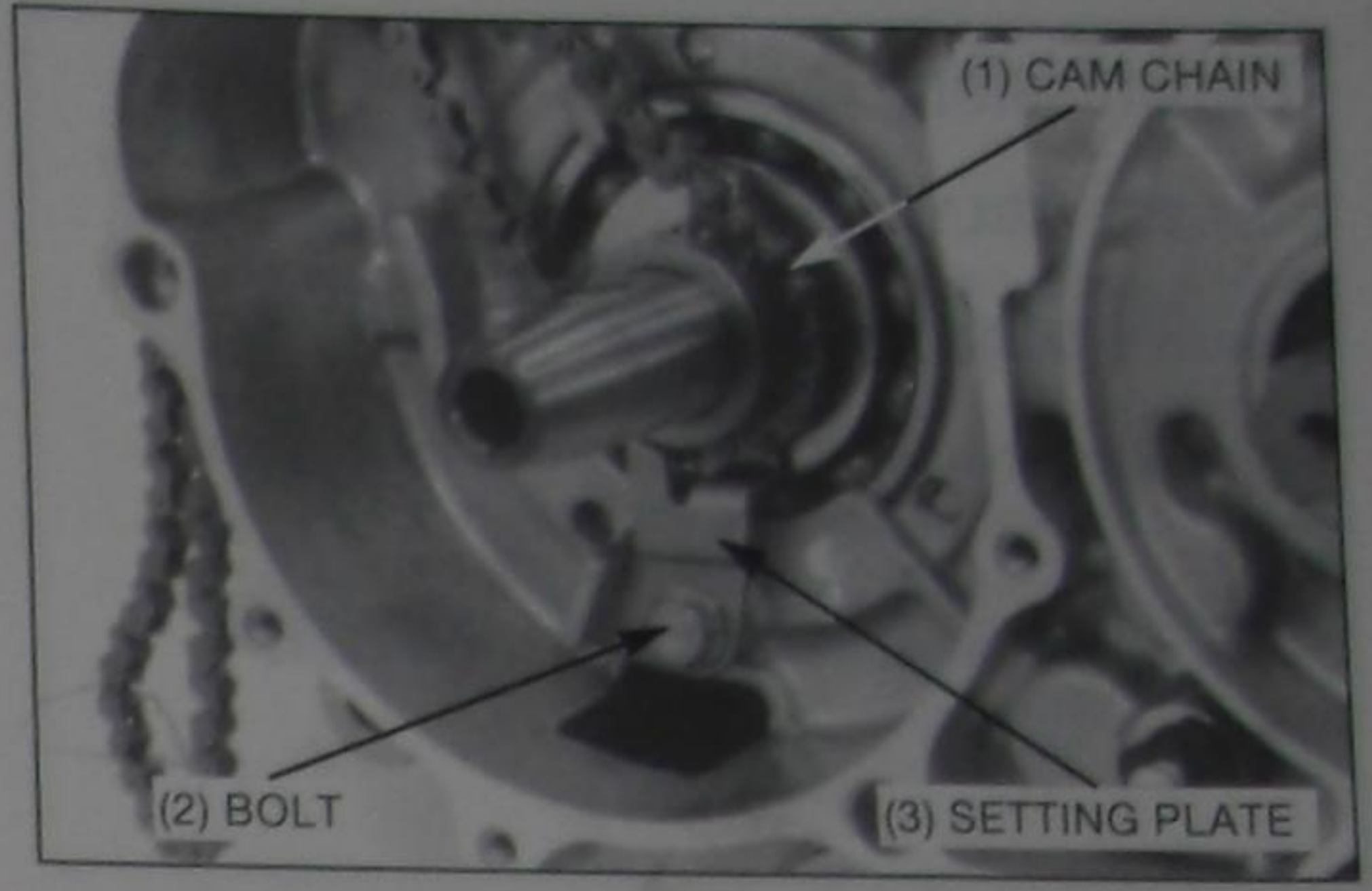
- Worn gear dogs or dog holes
- Worn shift drum guide groove
- Worn shift for guide pin
- Worn gear shifter groove
- Worn shift fork
- Bent shift fork shaft

**Hard to shift**

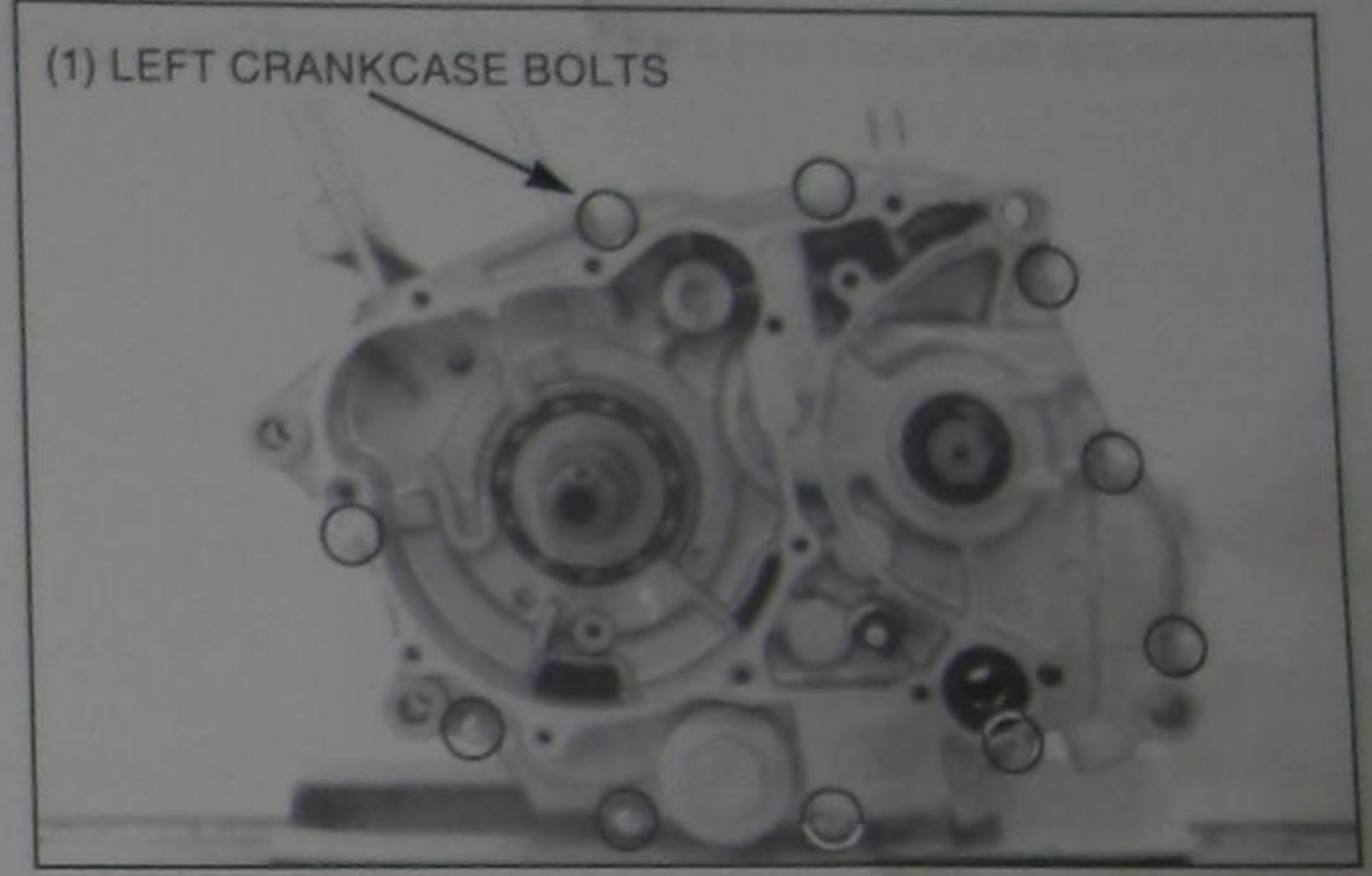
- Damaged shift fork
- Bent shift fork shaft
- Damaged shift fork guide pin
- Damaged shift drum guide groove

## Crankcase Separation

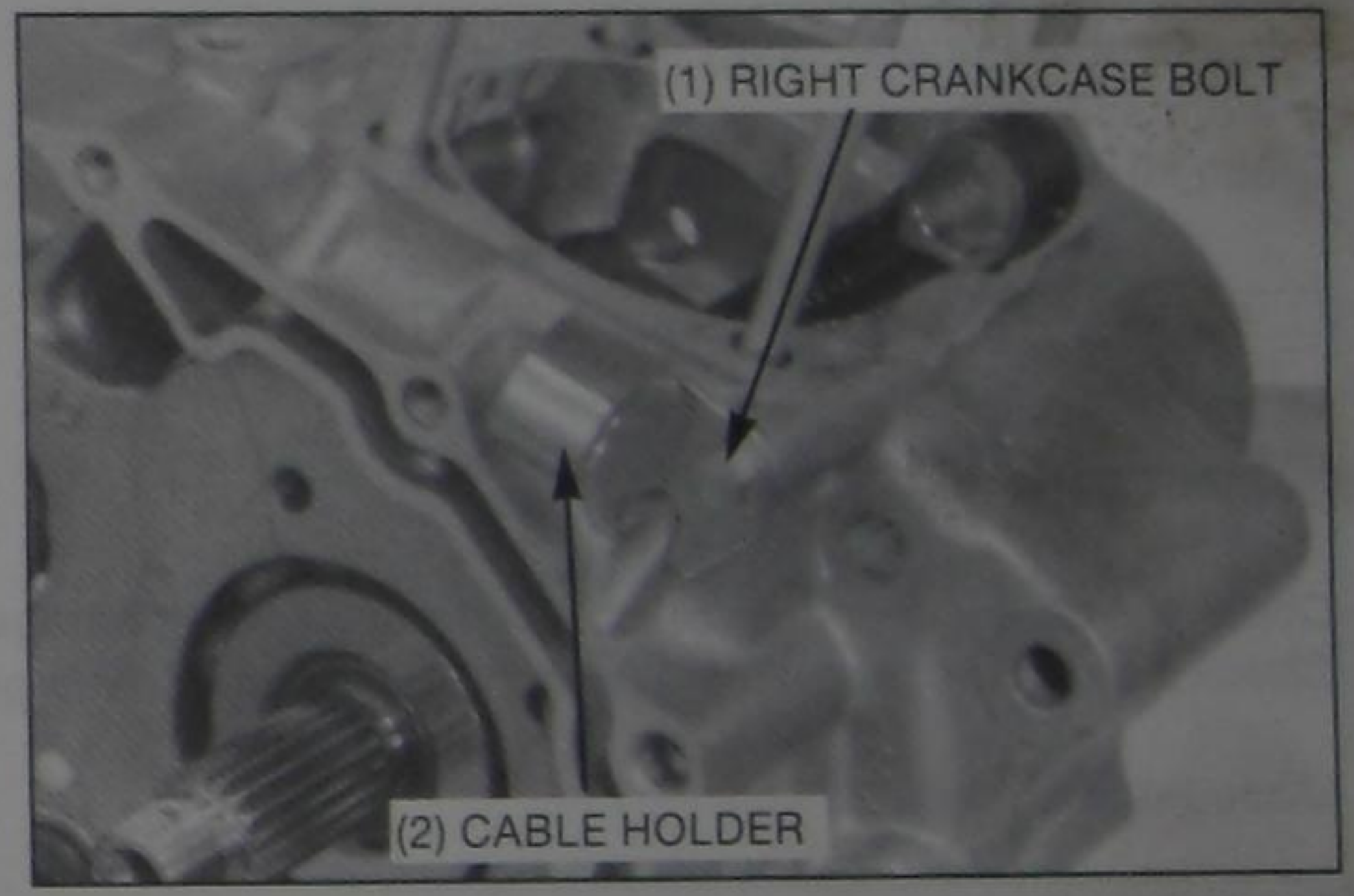
Remove the following
- Engine (section 6)
- Starter motor (section 17)
- Cylinder head (section 7)
- Cylinder, piston (section 8)
- Clutch, gearshift linkage (section 9)
- Oil pump (section 4)
- Flywheel (section 10)
- Bolt and cam chain setting plate
- Cam chain



Loosen the ten left crankcase bolts and remove them.

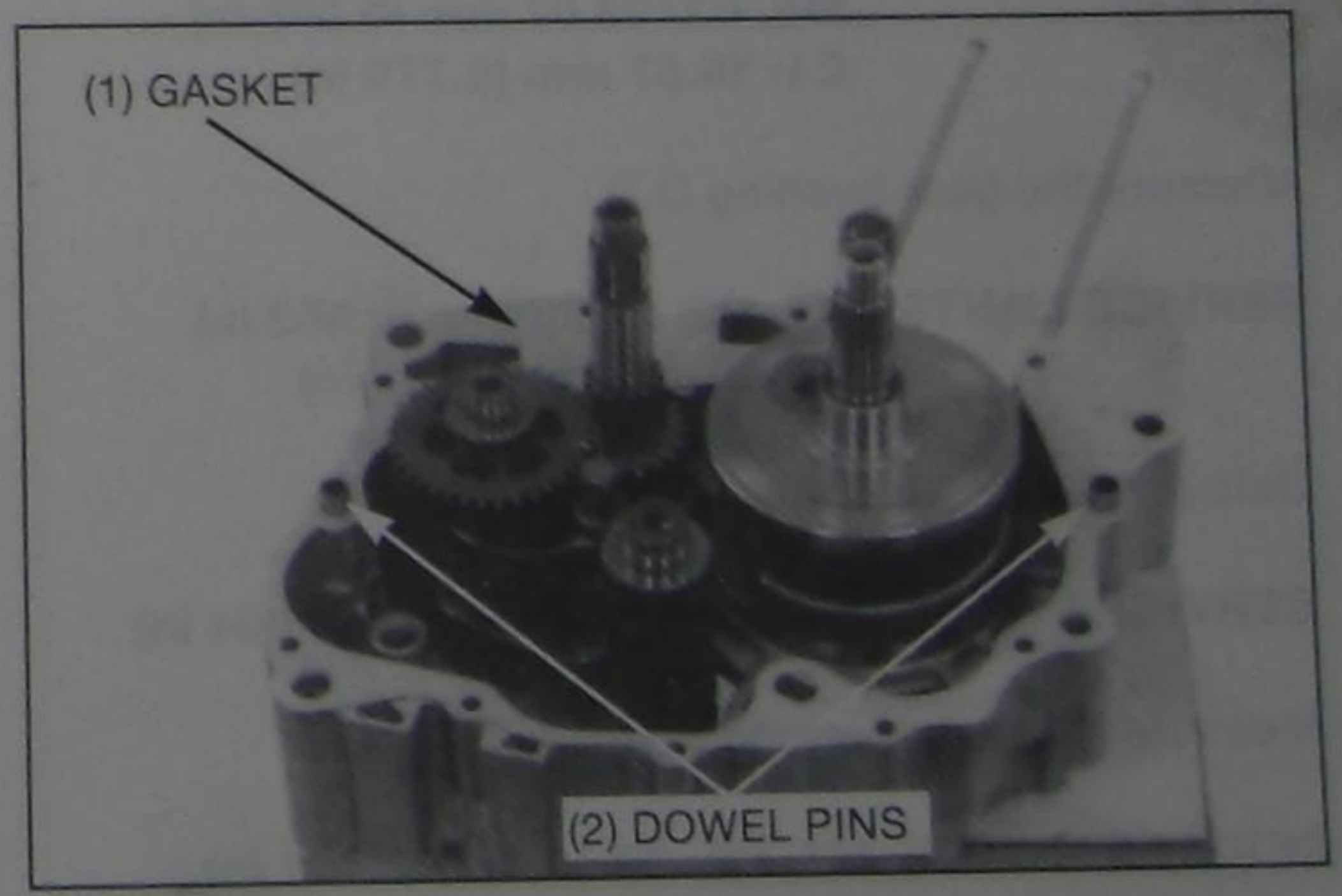


Remove the right crankcase bolt with the clutch cable holder.



Place the crankcase assembly with the left side down. Carefully separate the right crankcase from the left crankcase.

Remove the dowel pins and gasket.

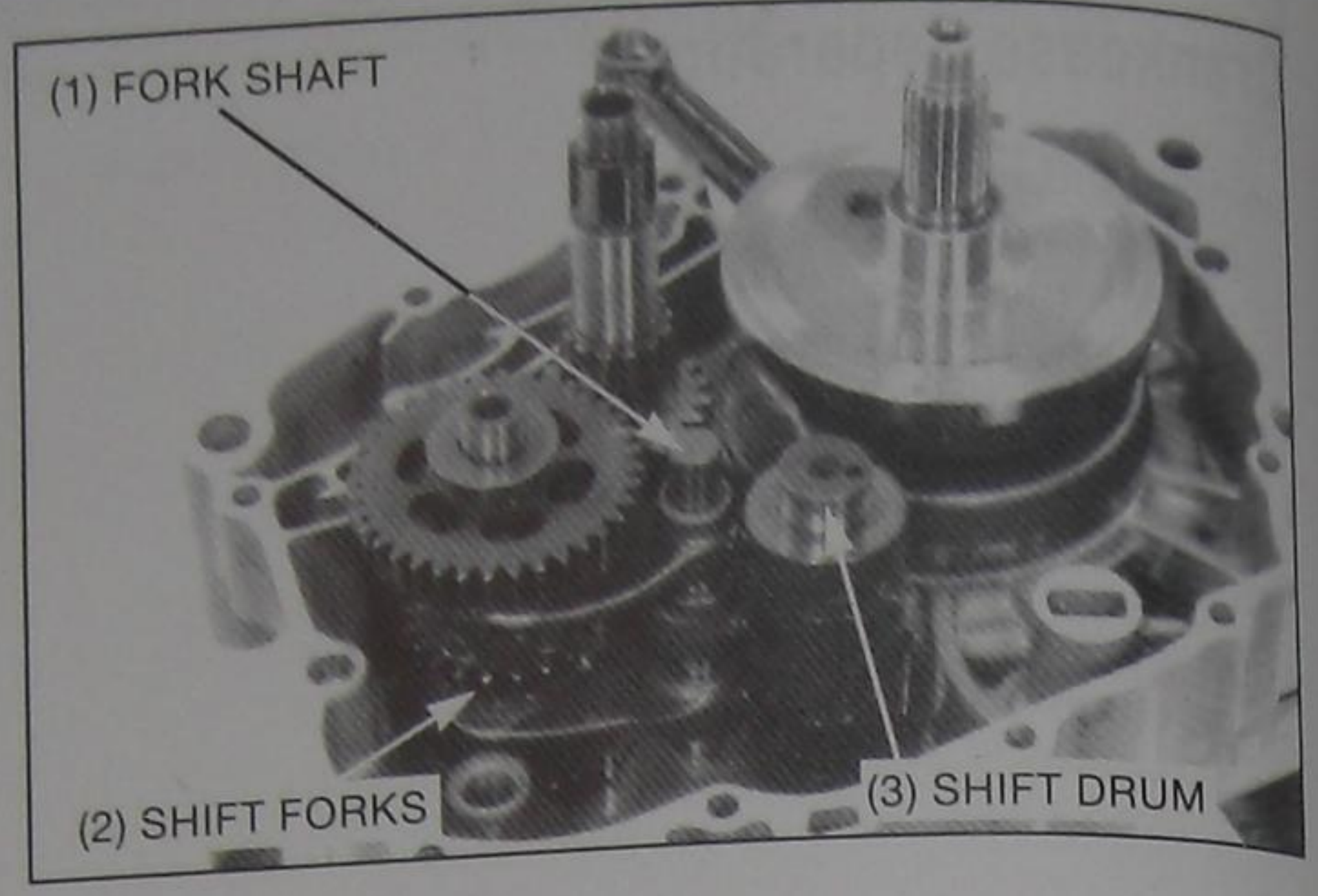


## Transmission

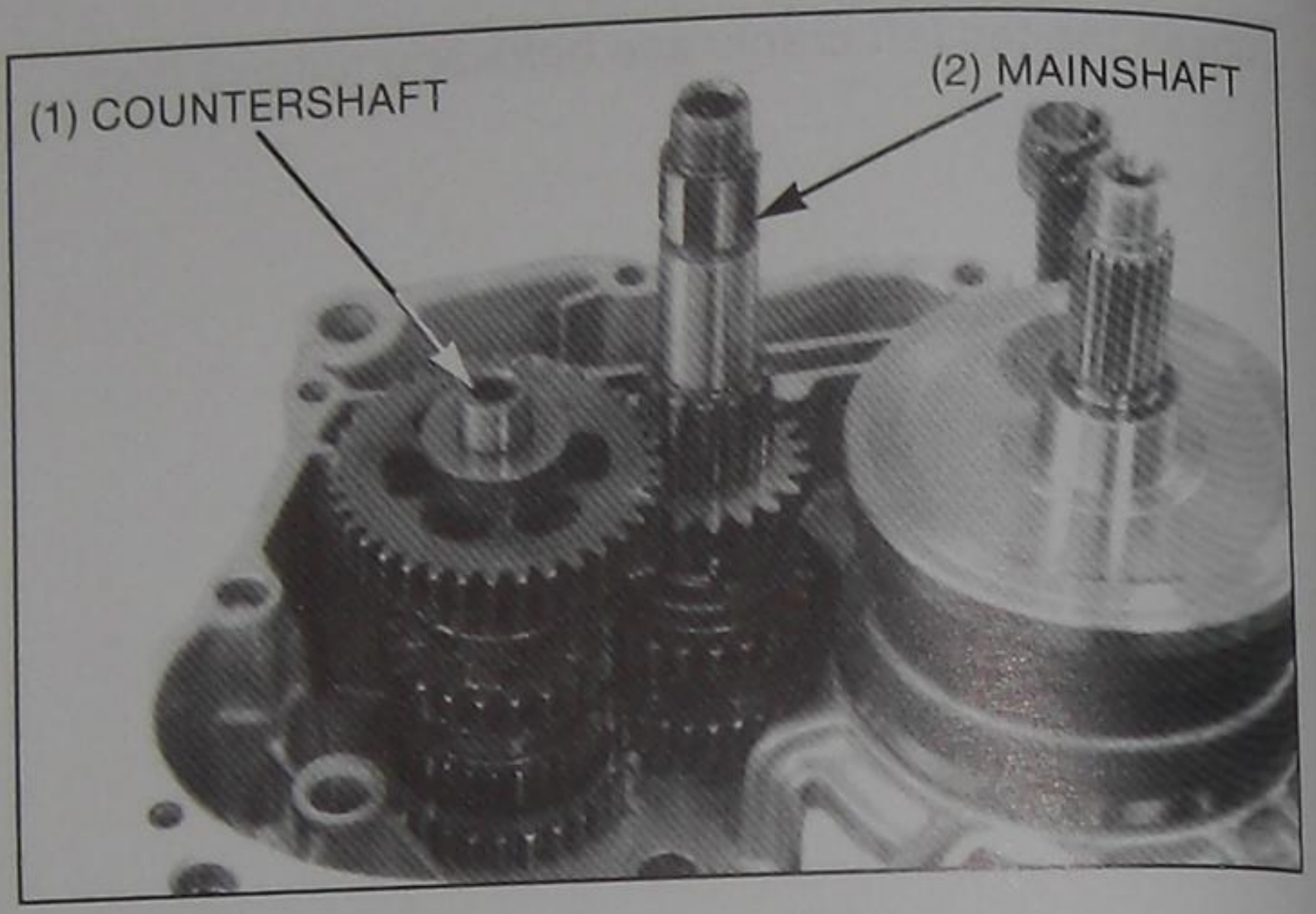
### DISASSEMBLY

Separate the crankcase (page 11-3).

Pull the fork shaft and remove it from the shift forks. Remove the shift drum and the shift forks.

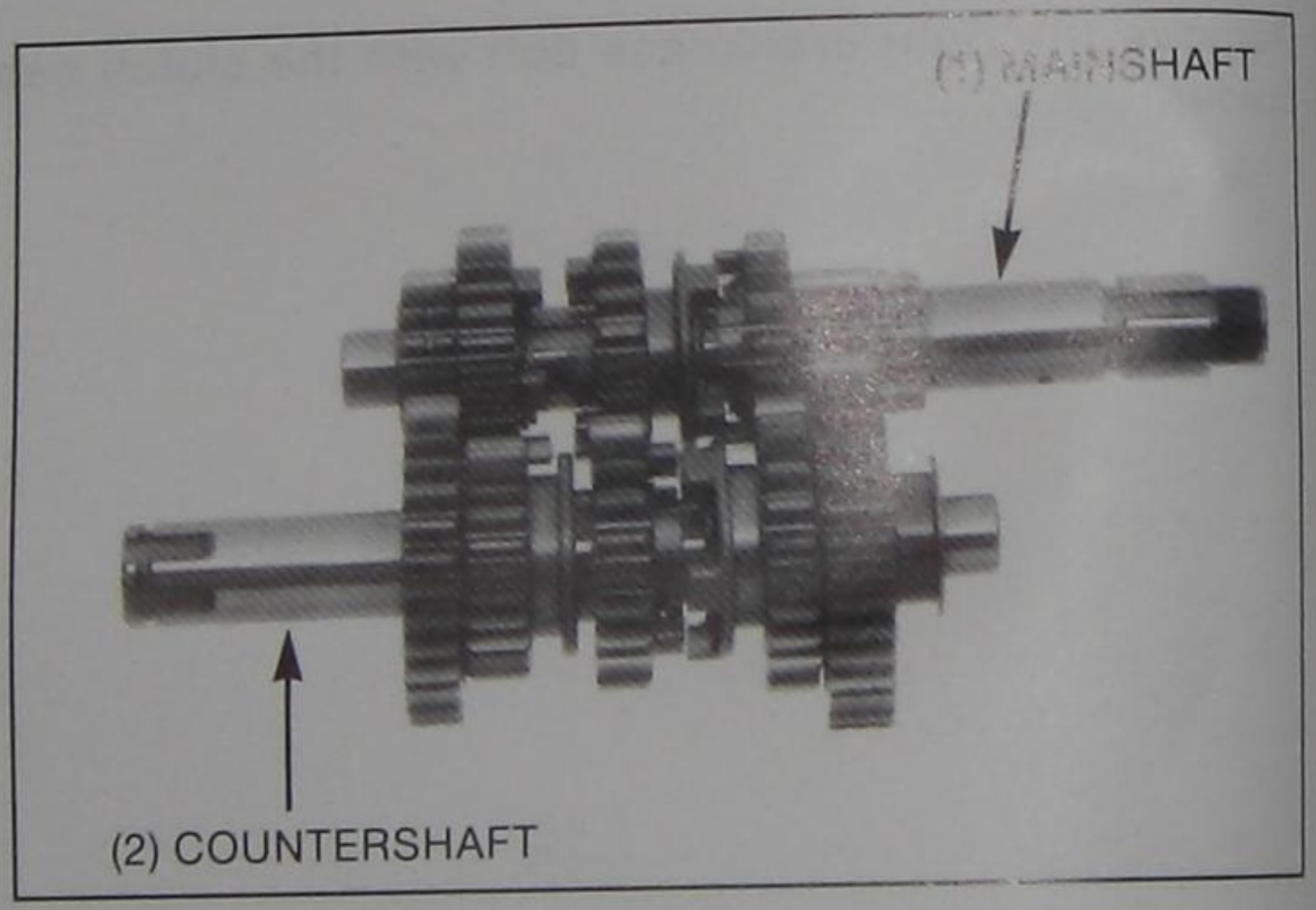


Remove the mainshaft and countershaft assemblies together.



Disassemble the mainshaft and countershaft.

Clean all disassembled parts in solvent thoroughly.



### INSPECTION

Check the gear shifter groove for abnormal wear or damage.
Check the gear dogs and teeth for abnormal wear or damage.

Measure the gear I.D.

**SERVICE LIMITS: M3, C4: 20.07 mm (0.790 in)**
**M5, C2: 23.07 mm (0.908 in)**
**C1: 19.57 mm (0.770 in)**

Measure the gear bushing O.D.

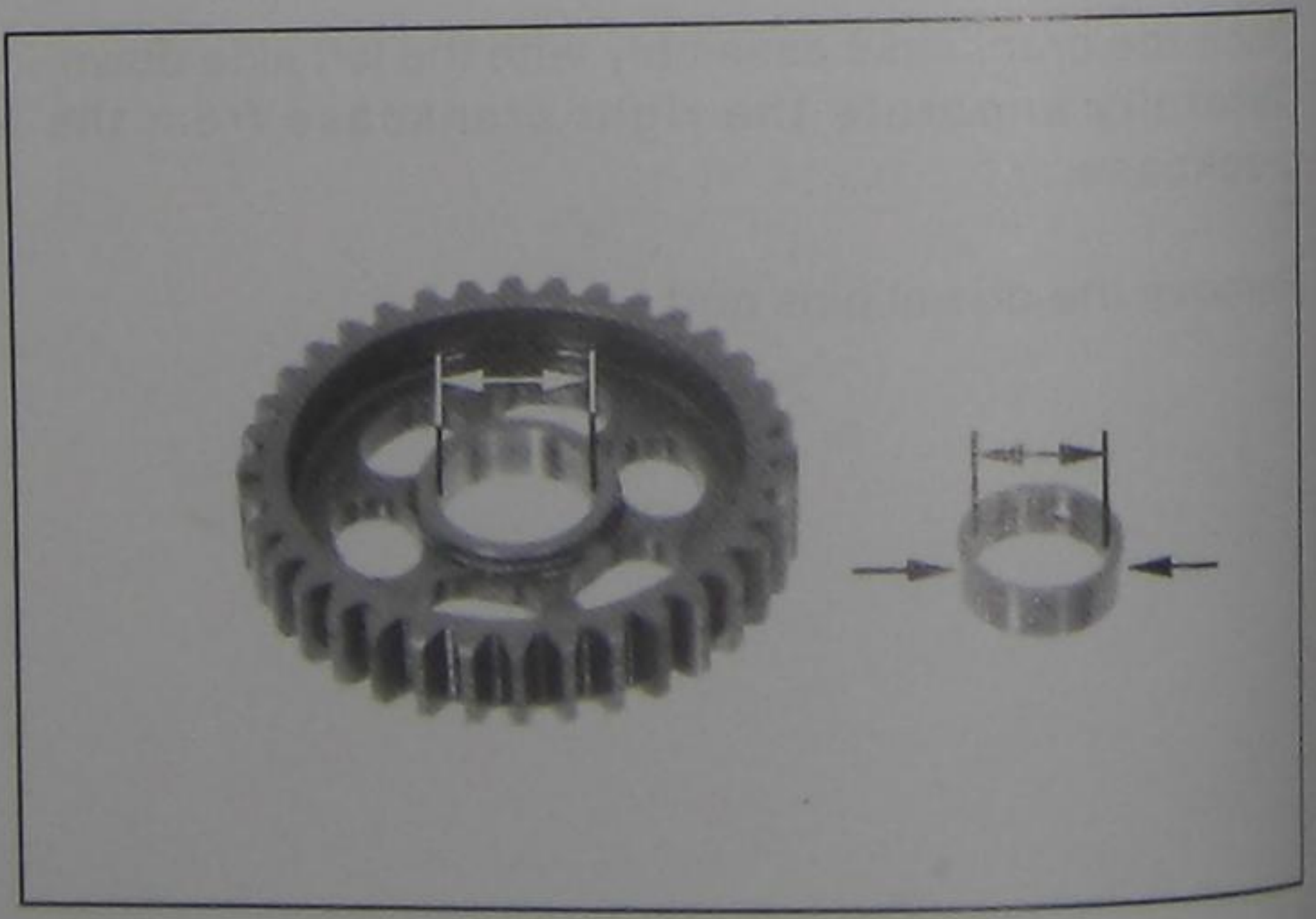
**SERVICE LIMITS: M5, C2: 22.93 mm (0.903 in)**
**C1: 19.43 mm (0.765 in)**

Calculate the gear-to-bushing clearance.

**SERVICE LIMITS: M5, C1, C2: 0.10 mm (0.004 in)**

Measure the gear bushing I.D.

**SERVICE LIMITS: M5, C2: 20.10 mm (0.791 in)**
**C1: 16.60 mm (0.654 in)**



Check the mainshaft and countershaft for abnormal wear or damage

Measure the mainshaft O.D. at the M3 and M5 gears.

**SERVICE LIMIT: M3, M5: 19.91 mm (0.784 in)**

Measure the countershaft O.D. at the C1, C2 and C4 gears.

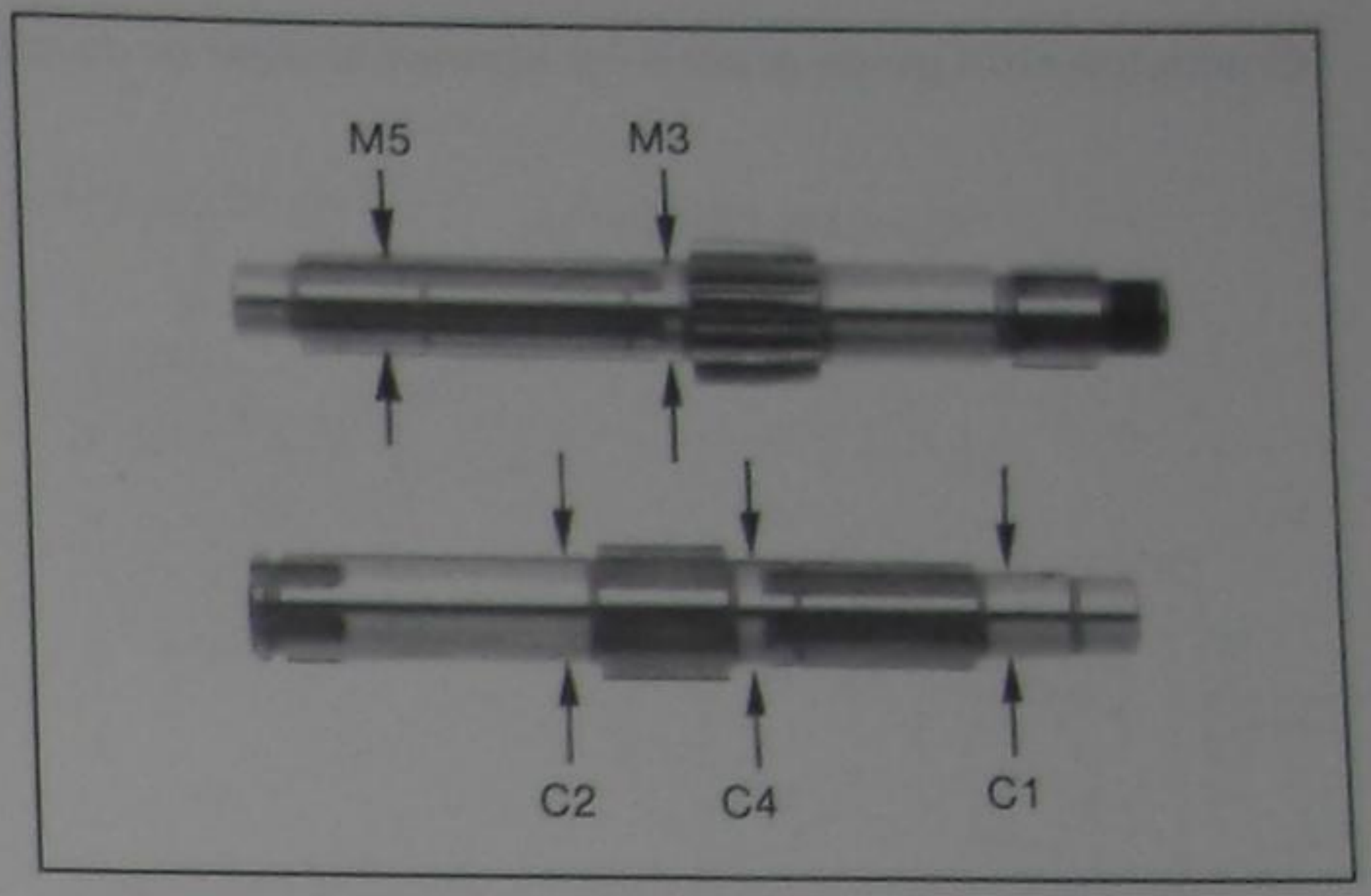
**SERVICE LIMITS: C1: 16.41 mm (0.646 in)**
**C2, C4: 19.91 mm (0.784 in)**

Calculate the gear bushing-to-shaft clearance.

**SERVICE LIMITS: M5: 0.111 mm (0.0044 in)**
**C1: 0.096 mm (0.0038 in)**
**C2: 0.10 mm (0.004 in)**

Calculate the gear-to-shaft clearance.

**SERVICE LIMIT: M3, C4: 0.111 mm (0.0044 in)**

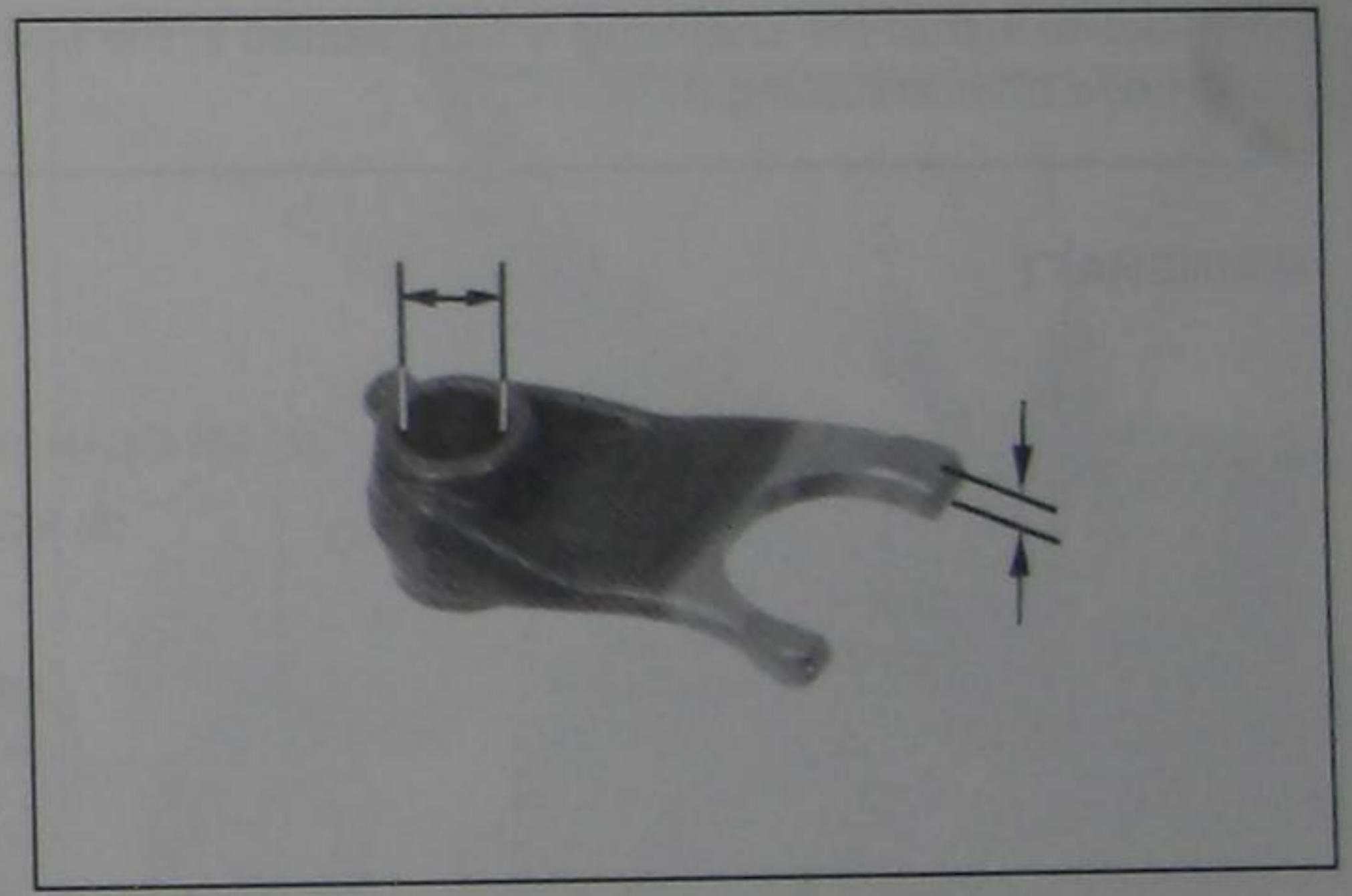


Check the shift fork guide pins for abnormal wear or damage.
Check the fork claw for deformation or abnormal wear.
Measure the shift fork I.D.

**SERVICE LIMIT: 12.05 mm (0.474 in)**

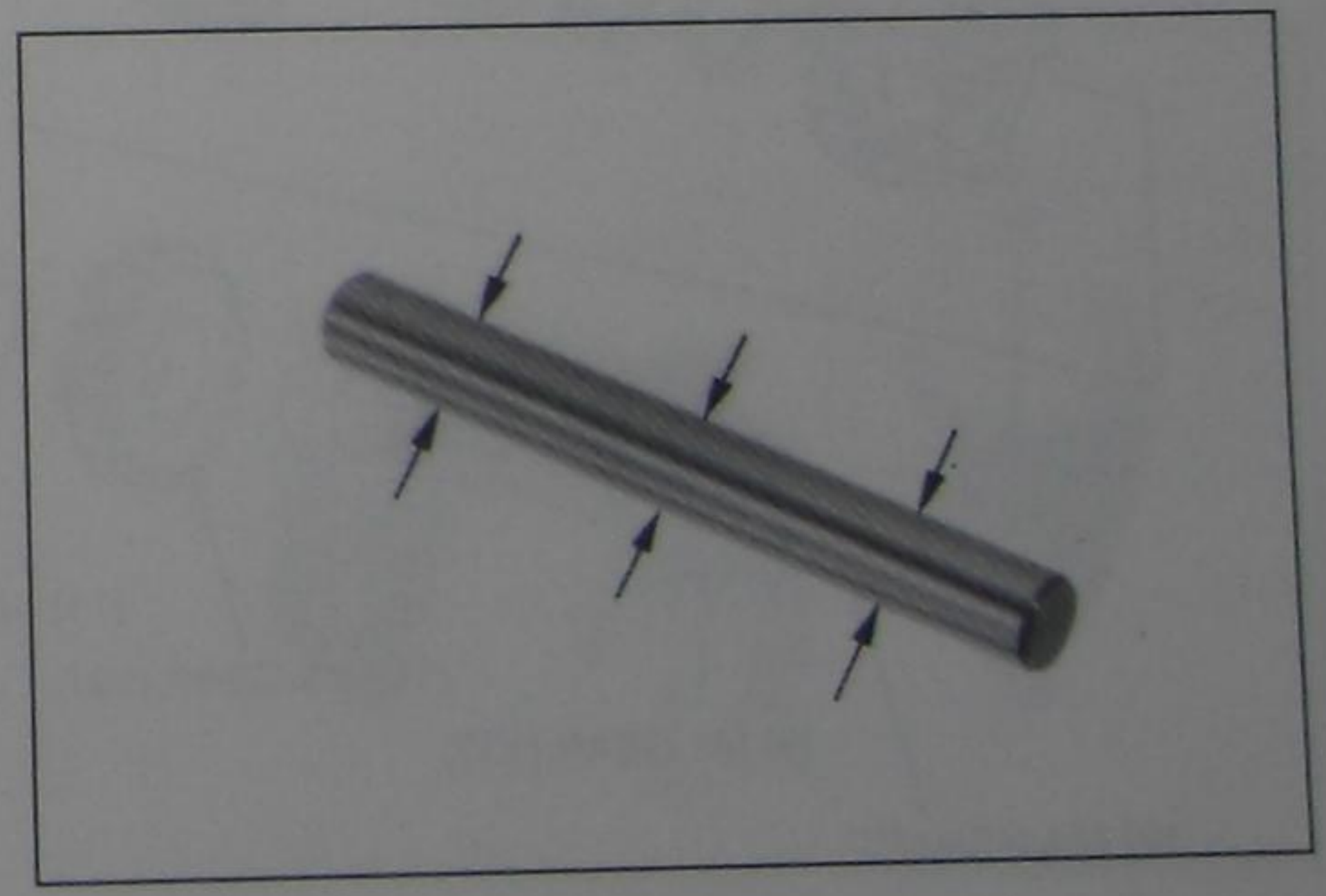
Measure the claw thickness.

**SERVICE LIMIT: 4.70 mm (0.185 in)**

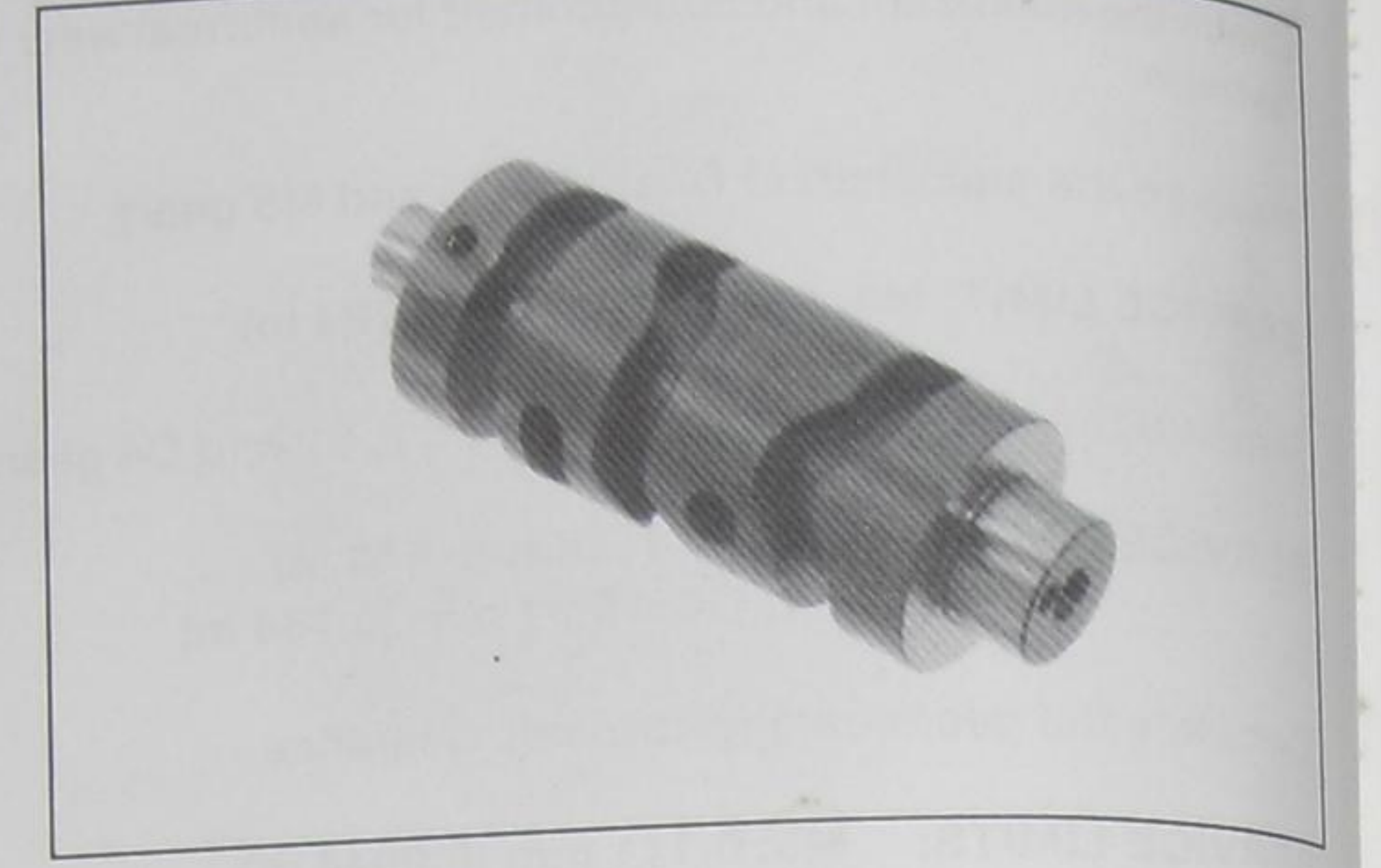


Check the shift fork shaft for abnormal wear or damage.
Measure the fork shaft O.D.

**SERVICE LIMIT: 11.90 mm (0.469 in)**



Check the shift guide groove for abnormal wear or damage.



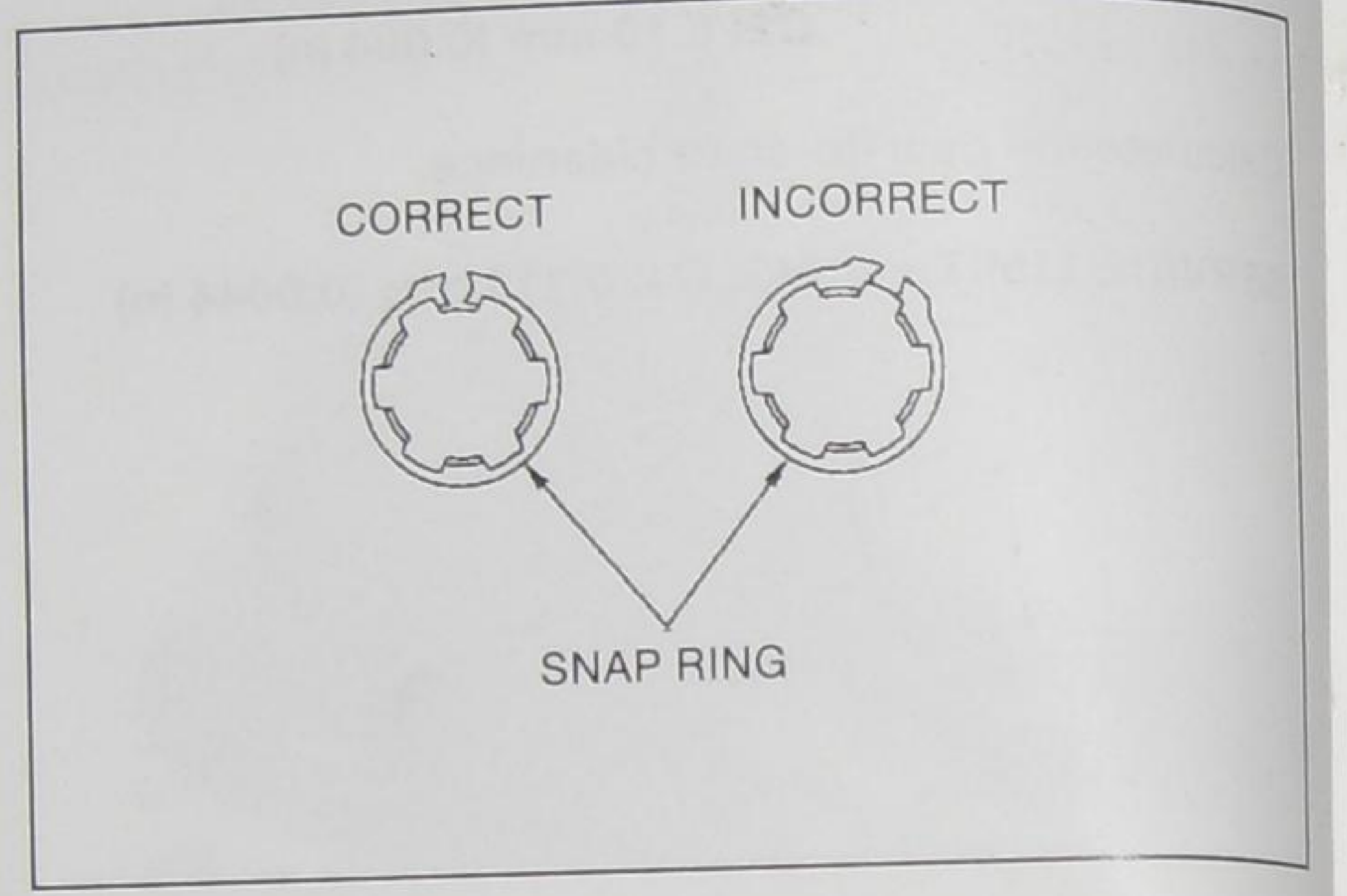
## ASSEMBLY

Apply molybdenum oil solution to the inner rotating surface of the transmission gears.

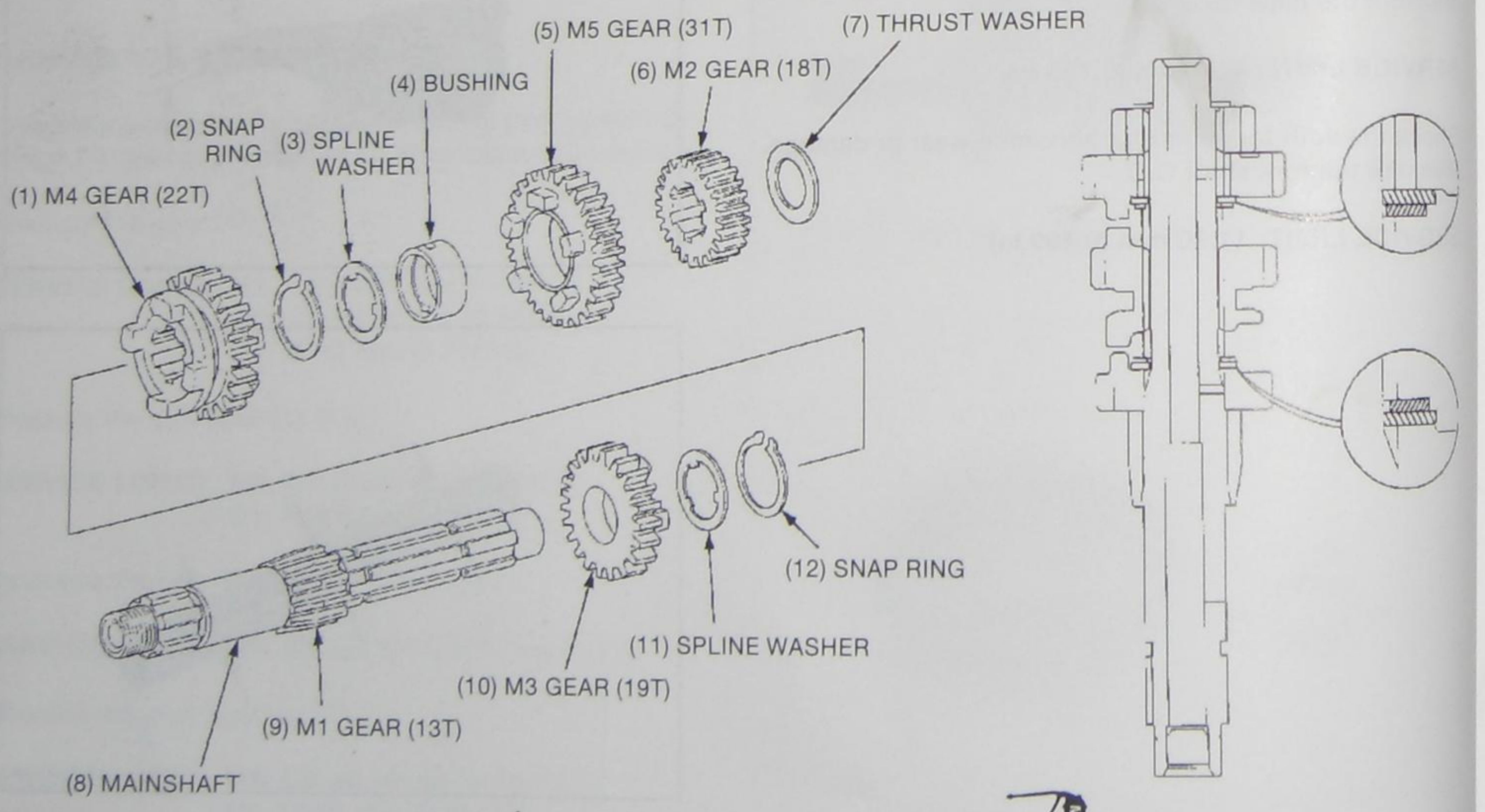
Assemble the mainshaft and countershaft.

NOTE:

- Always install the washer and snap ring with the chamfered (rolled) edge facing away from the thrust load.
- Do not reuse worn snap ring which could easily spin in the groove.
- Install the snap ring so that its end gap aligns with the groove in the splines.
- Make sure that the snap ring is fully seated in the shaft groove after installing it.

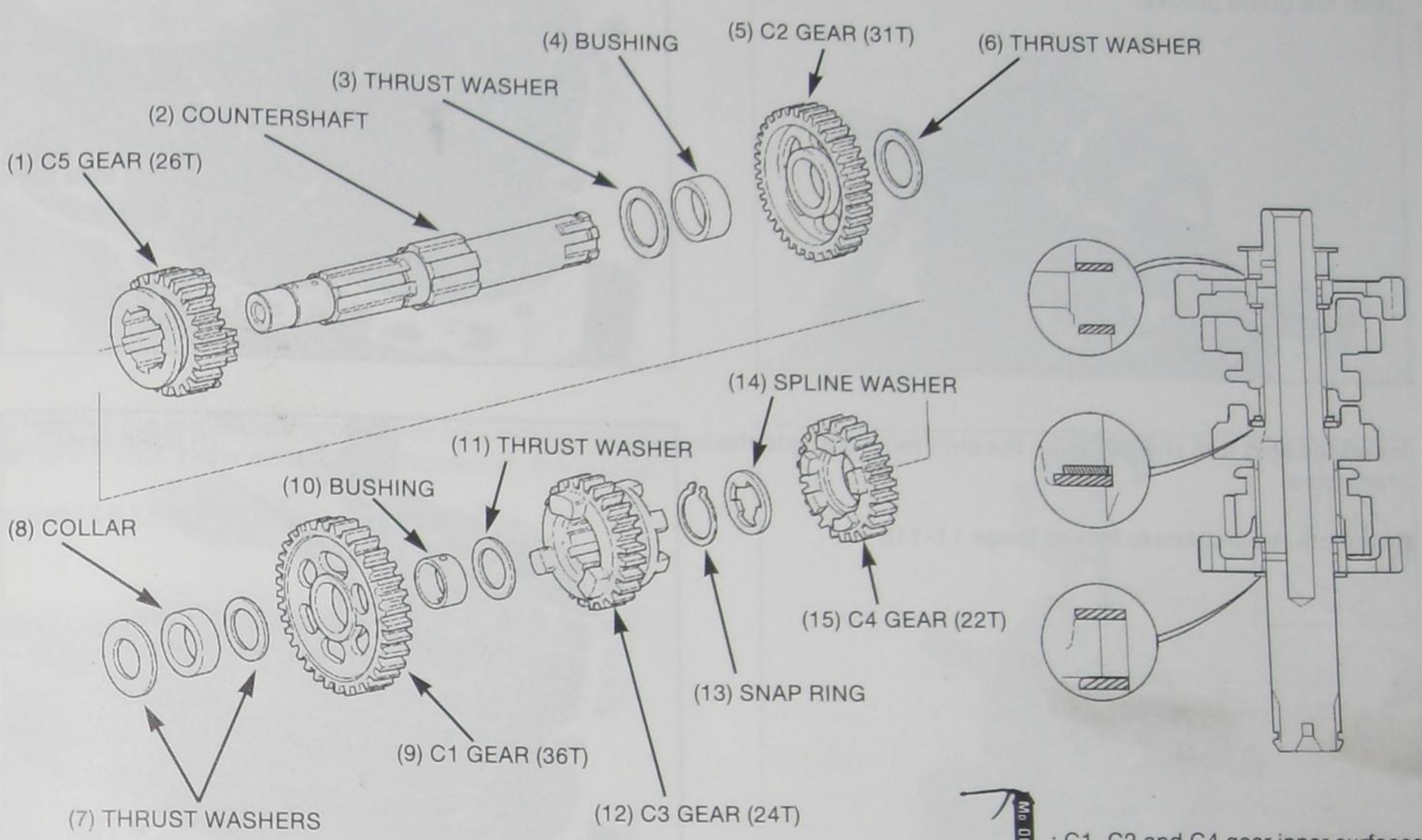

CORRECT
INCORRECT
SNAP RING

### MAINSHAFT


(1) M4 GEAR (22T)
(2) SNAP RING
(3) SPLINE WASHER
(4) BUSHING
(5) M5 GEAR (31T)
(6) M2 GEAR (18T)
(7) THRUST WASHER
(8) MAINSHAFT
(9) M1 GEAR (13T)
(10) M3 GEAR (19T)
(11) SPLINE WASHER
(12) SNAP RING

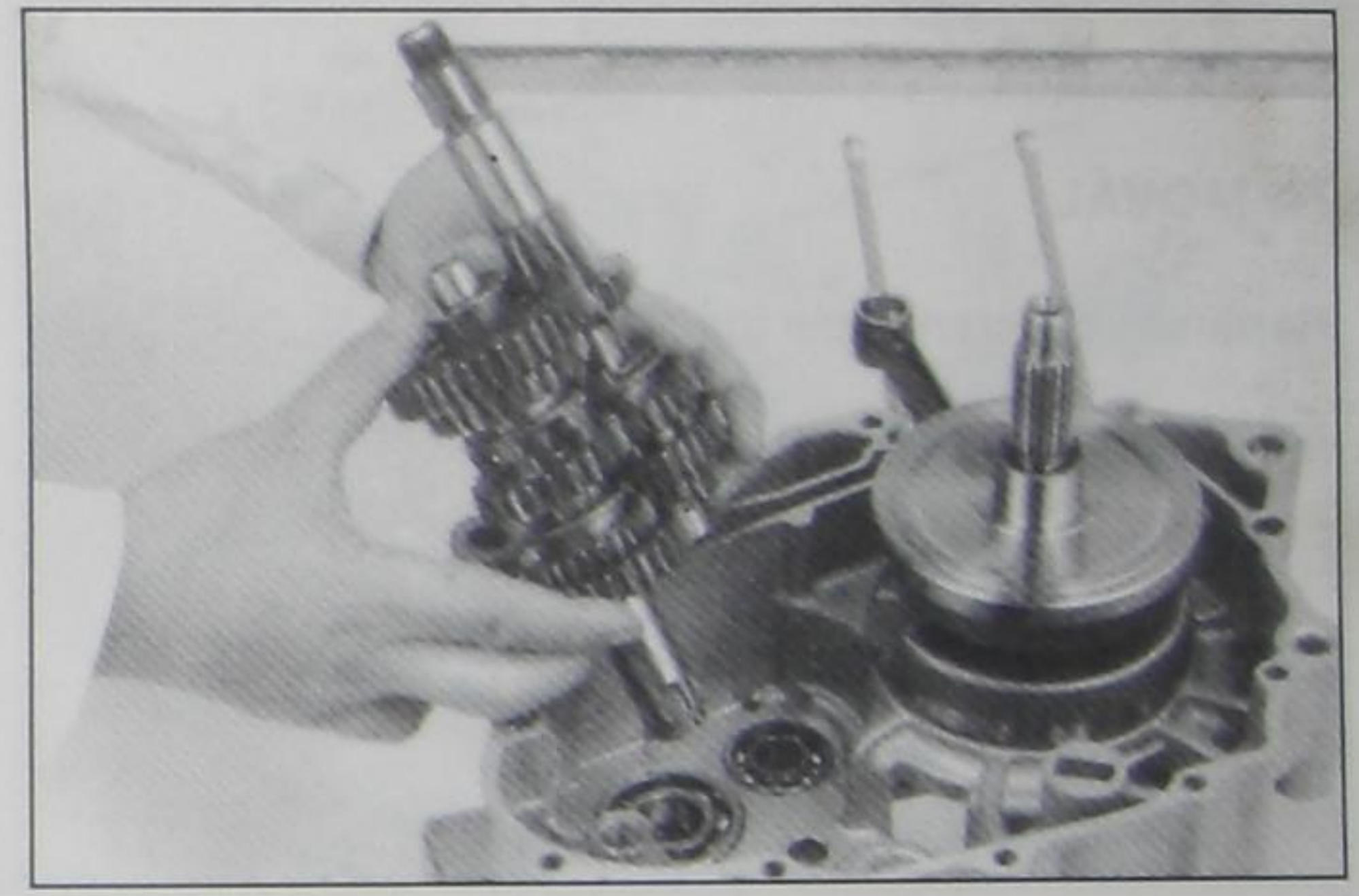
: M3 and M5 gear inner surfaces

### COUNTERSHAFT

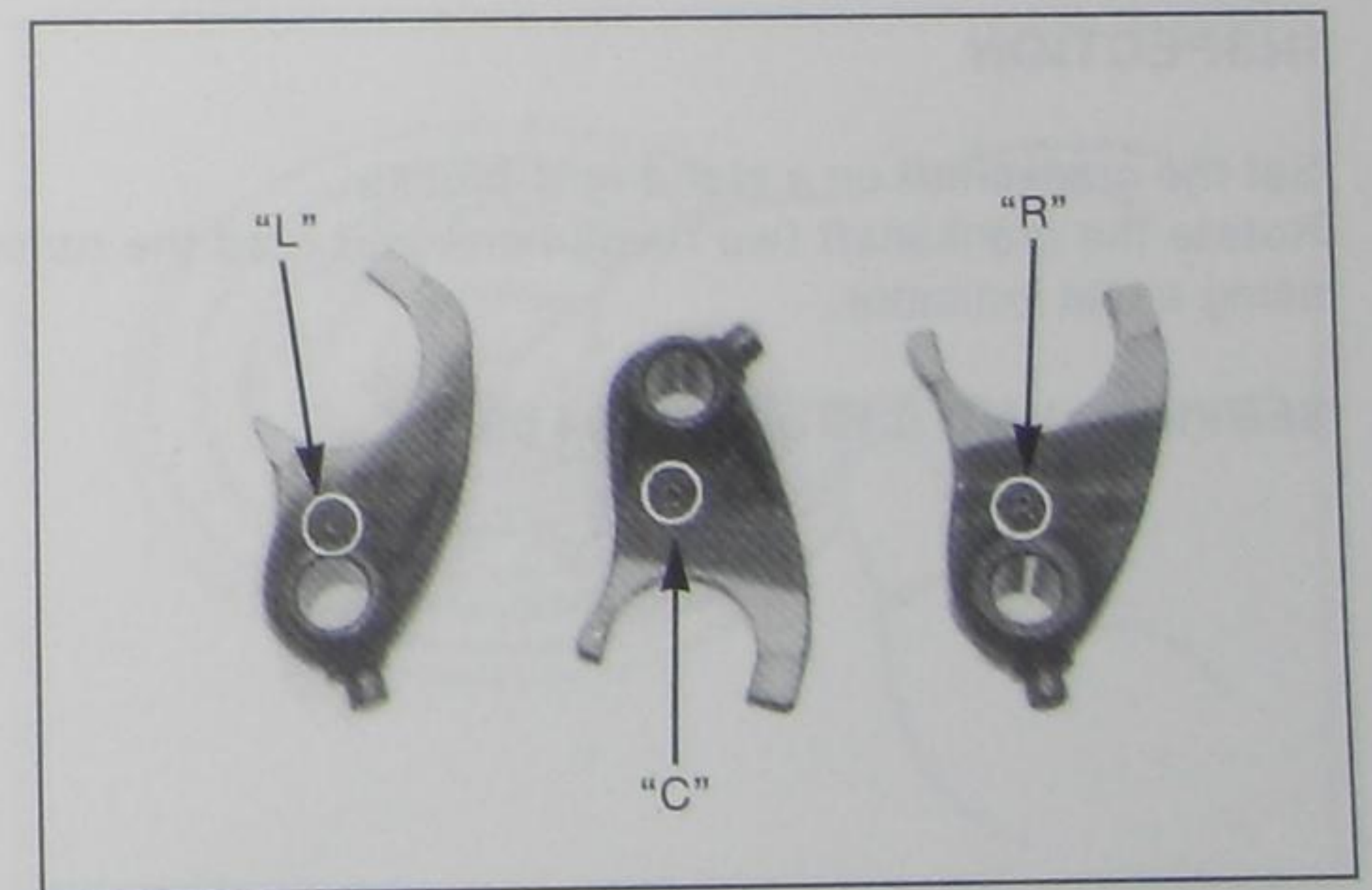

(1) C5 GEAR (26T)
(2) COUNTERSHAFT
(3) THRUST WASHER
(4) BUSHING
(5) C2 GEAR (31T)
(6) THRUST WASHER
(7) THRUST WASHERS
(8) COLLAR
(9) C1 GEAR (36T)
(10) BUSHING
(11) THRUST WASHER
(12) C3 GEAR (24T)
(13) SNAP RING
(14) SPLINE WASHER
(15) C4 GEAR (22T)

: C1, C2 and C4 gear inner surfaces

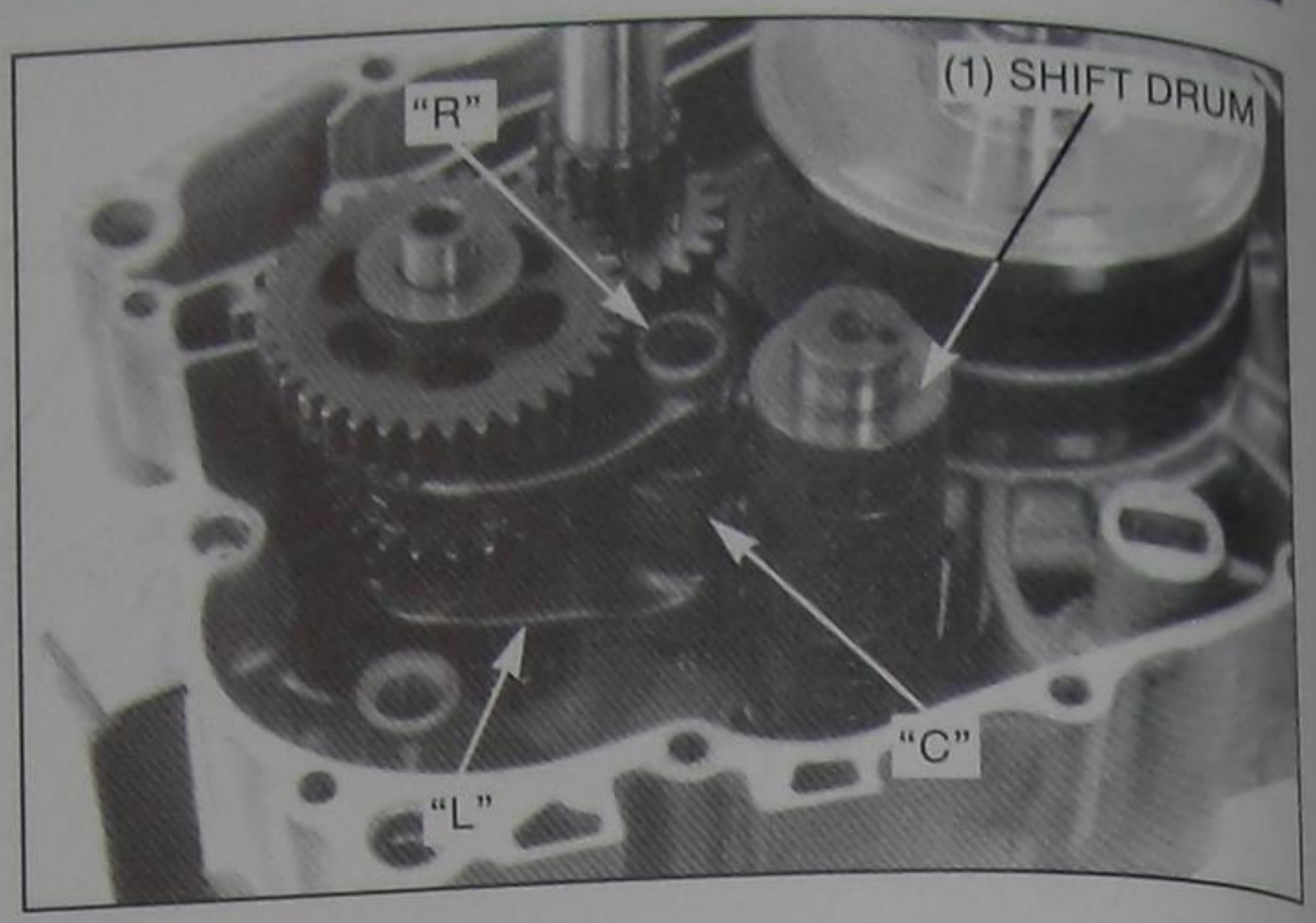
Install the mainshaft and countershaft assemblies into the left crankcase.



Each shift fork has an identification marks; “L” (Left), “C” (Center), “R” (Right).
Install the shift forks into the shifter gear grooves with the marks facing down (left crankcase side).

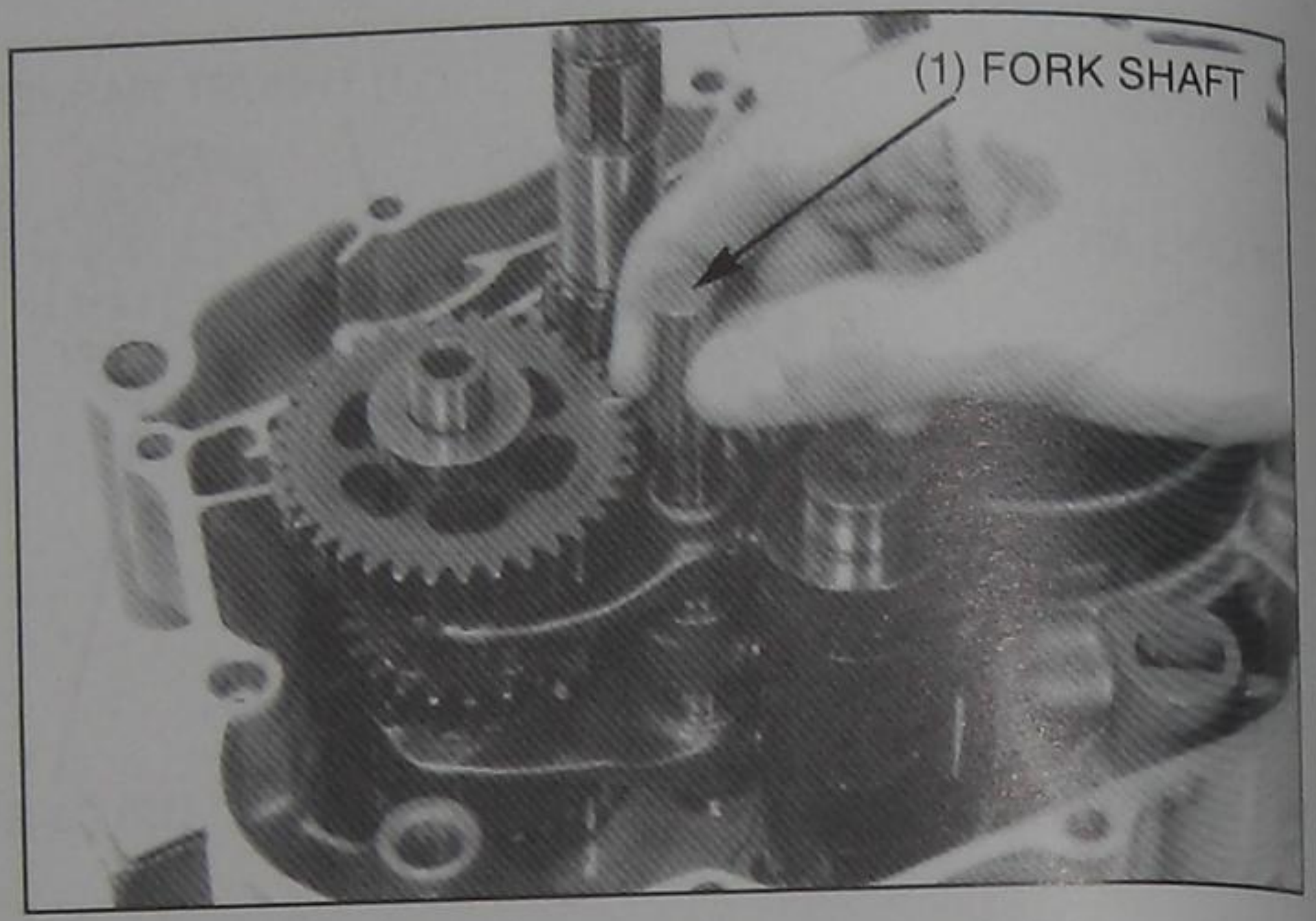


Install the shift drum by aligning the shift fork guide pins with the guide groove.



Insert the shift fork shaft through the shift forks and into the crankcase.

Assemble the crankcase halves (page 11-11).

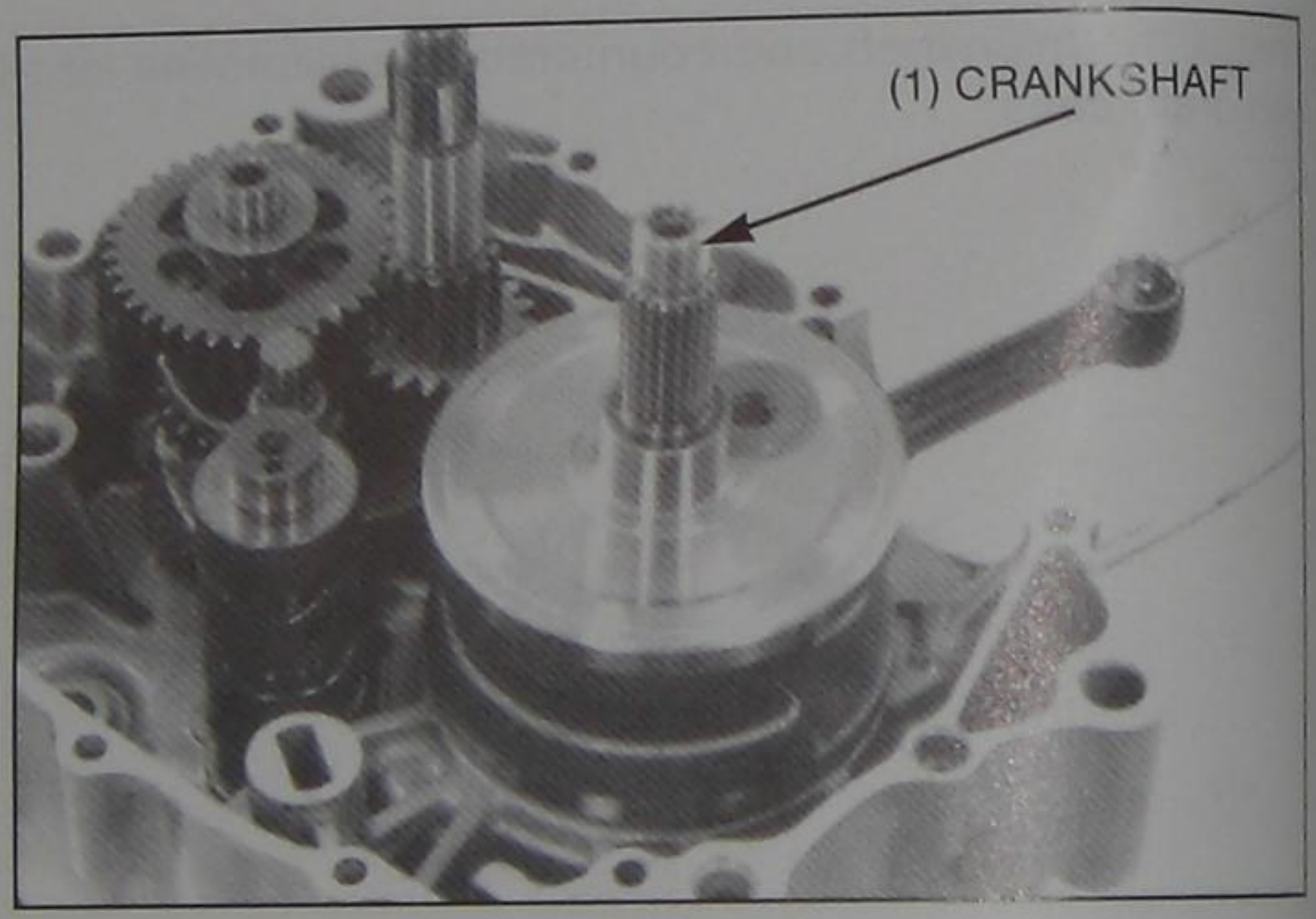


## Cranksahft

### REMOVAL

Separate the crankcase (page 11-3).

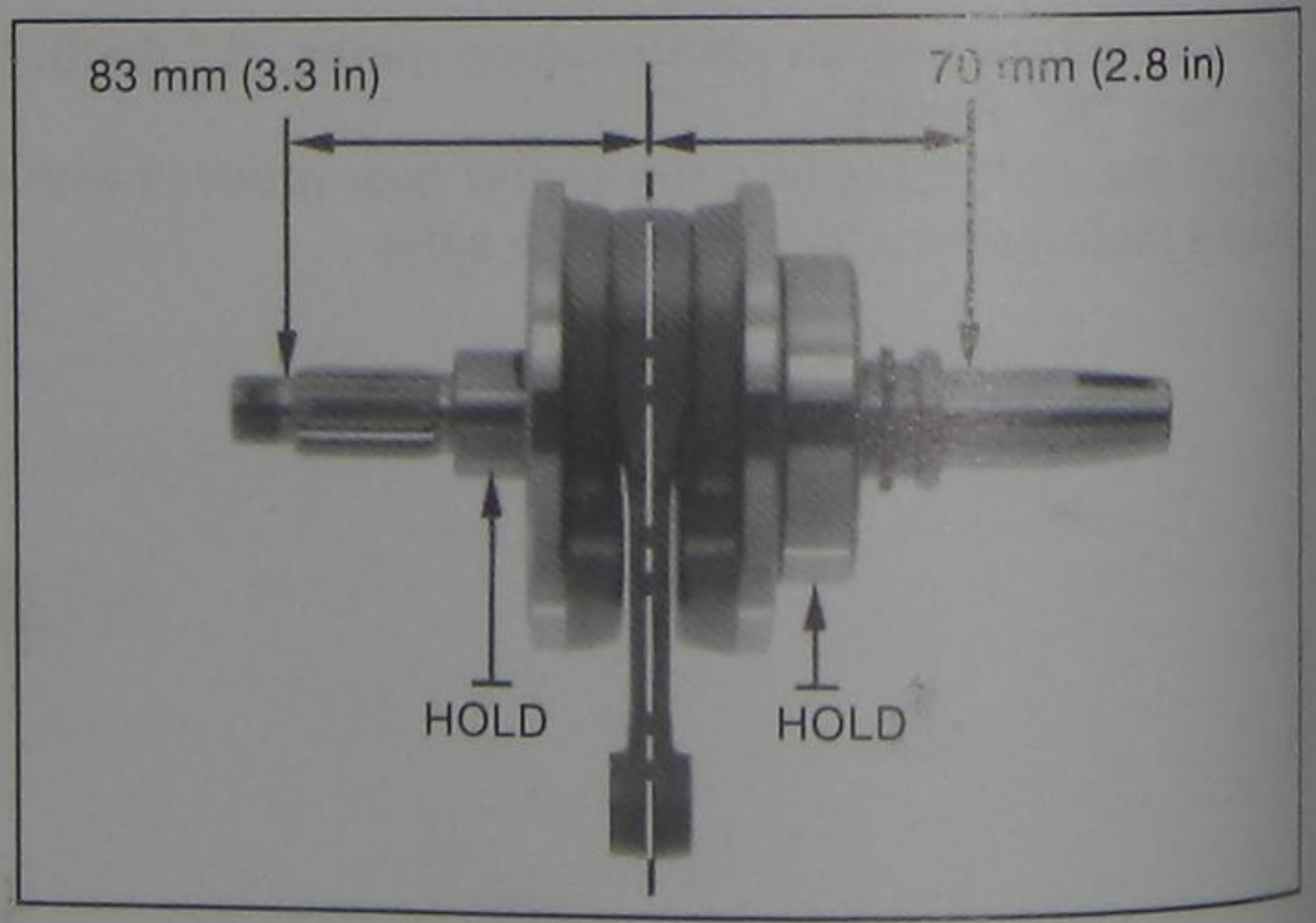
Remove the crankshaft.



### INSPECTION

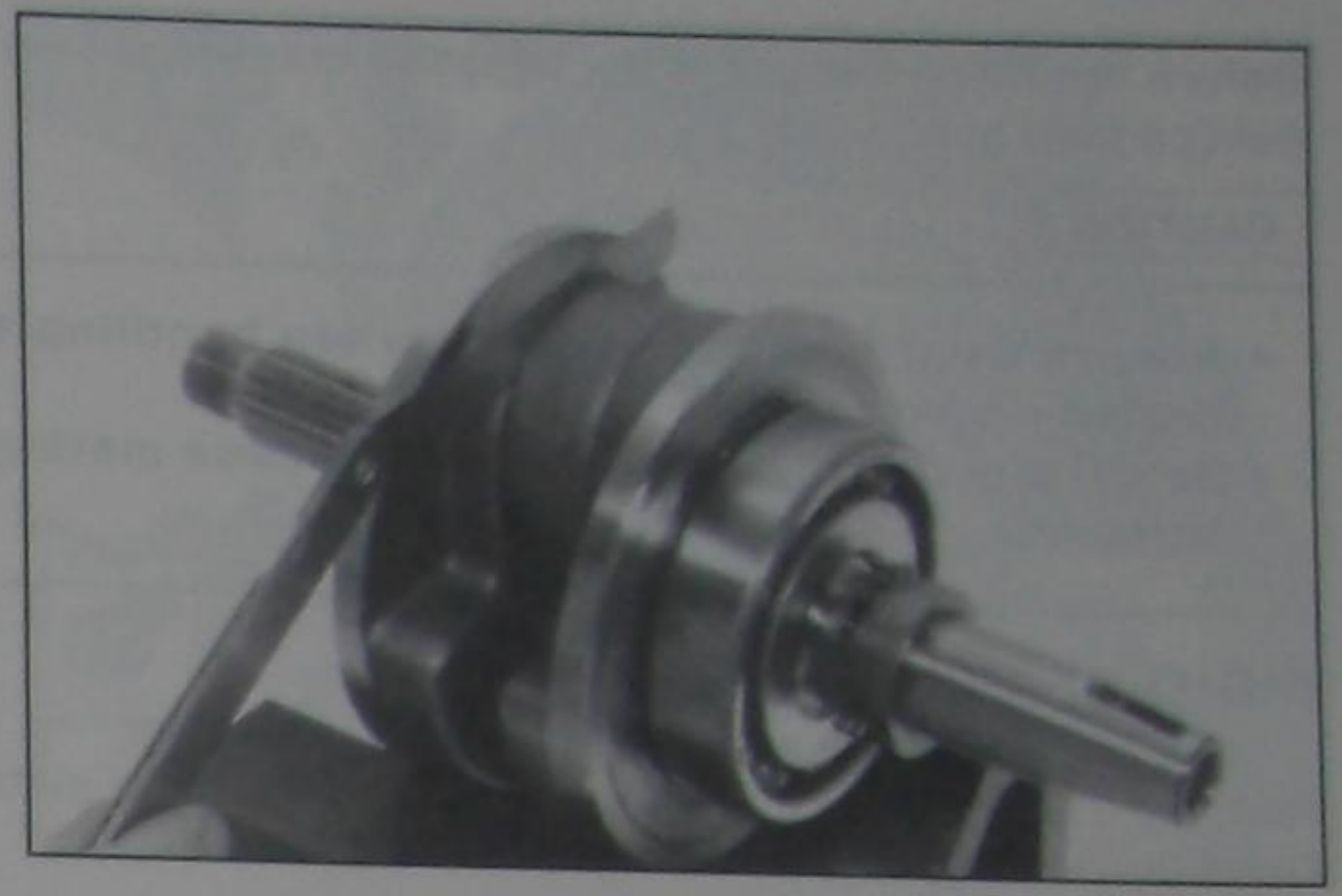
Set the crankshaft on a stand or V-blocks.
Rotate the crankshaft two revolutions and read the runout using a dial indicator.

**SERVICE LIMIT:** **0.10 mm (0.004 in)**



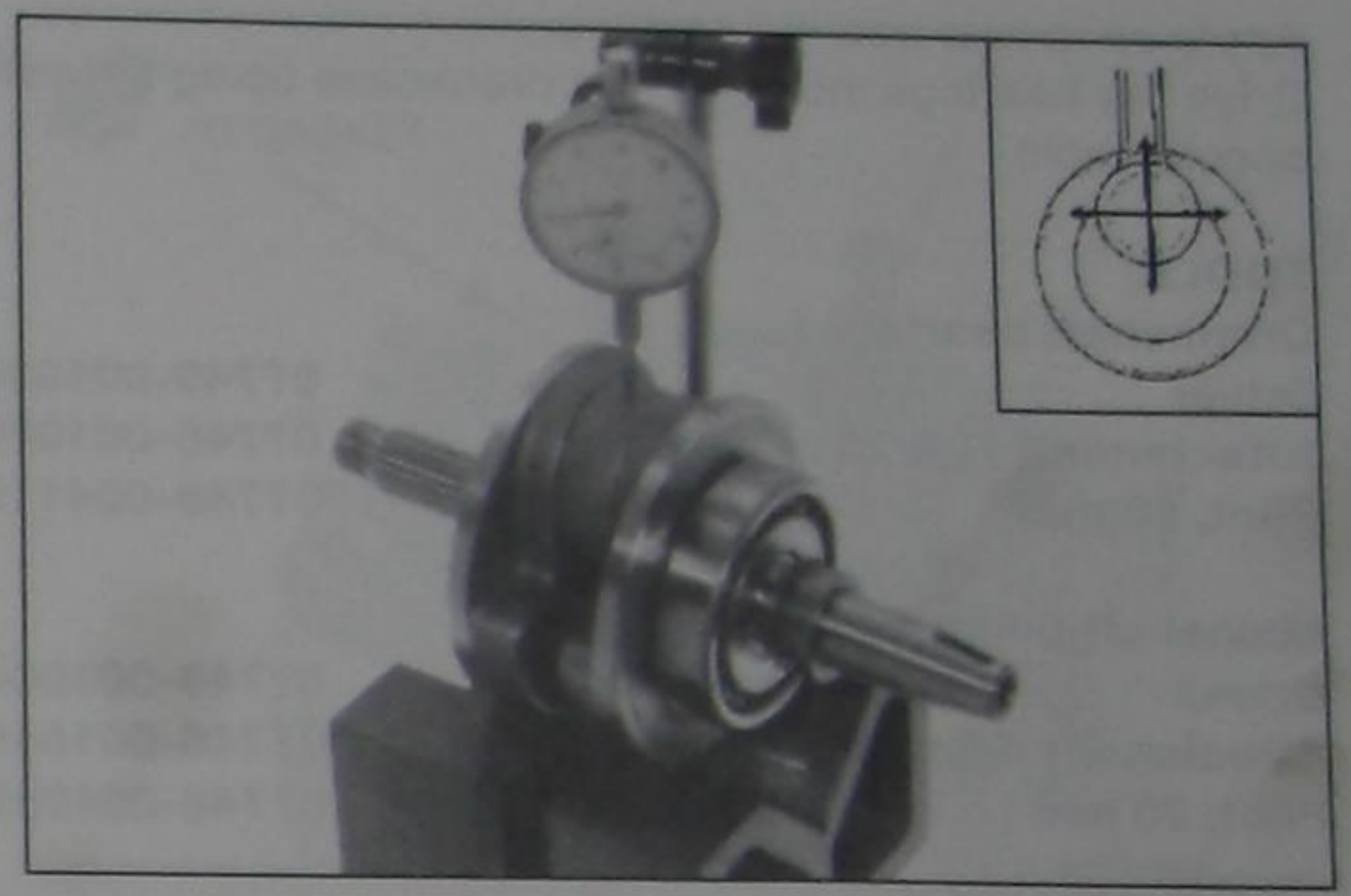
Measure the side clearance of the connecting rod big end with a feeler gauge.

**SERVICE LIMIT:** **0.5 mm (0.02 in)**



Measure the radial clearance of the connecting rod big end at two points in the directions indicated by the arrows.

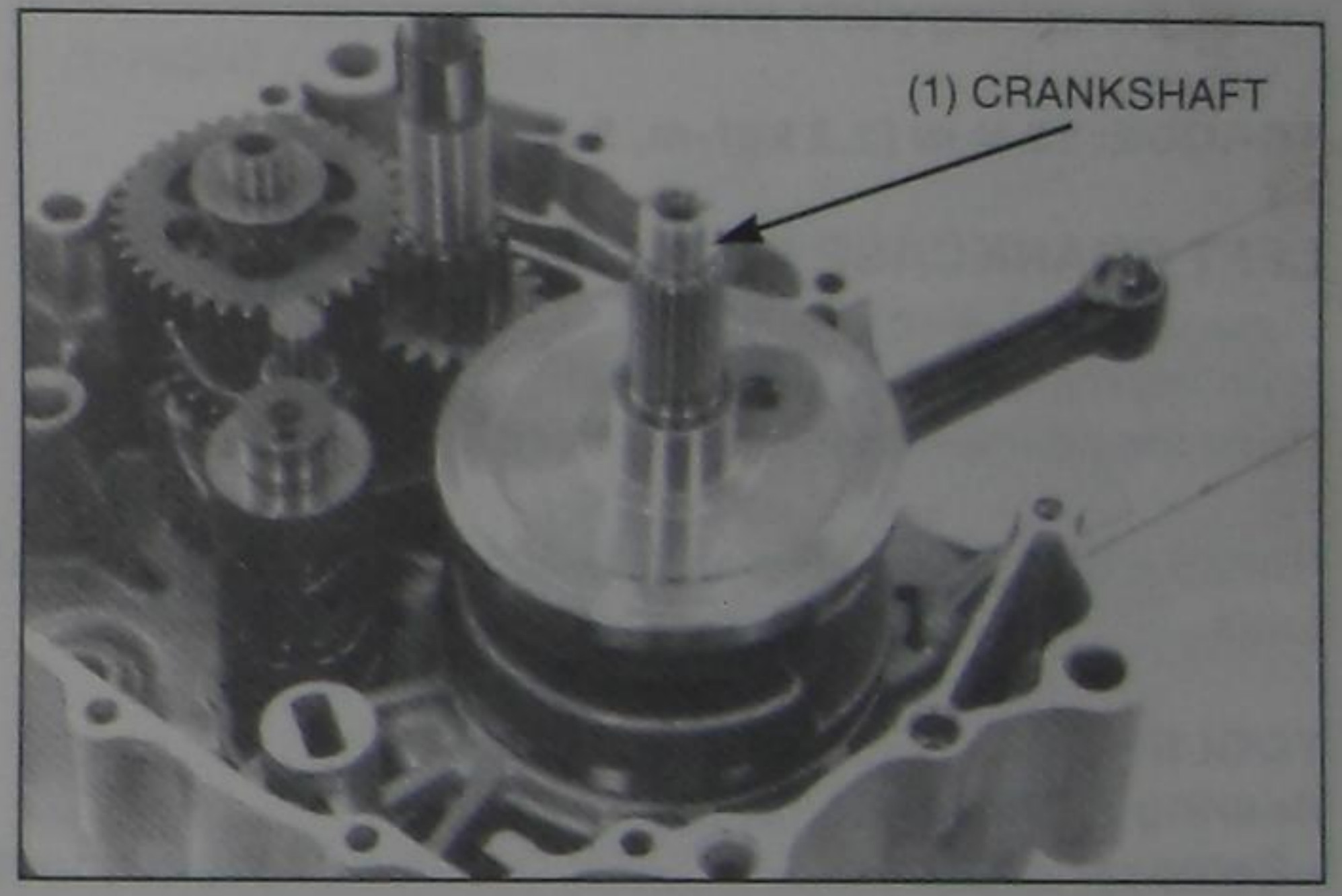
**SERVICE LIMIT:** **0.05 mm (0.002 in)**



### INSTALLATION

Install the crankshaft into the left crankcase.

Assemble the crankcase halves (page 11-11).

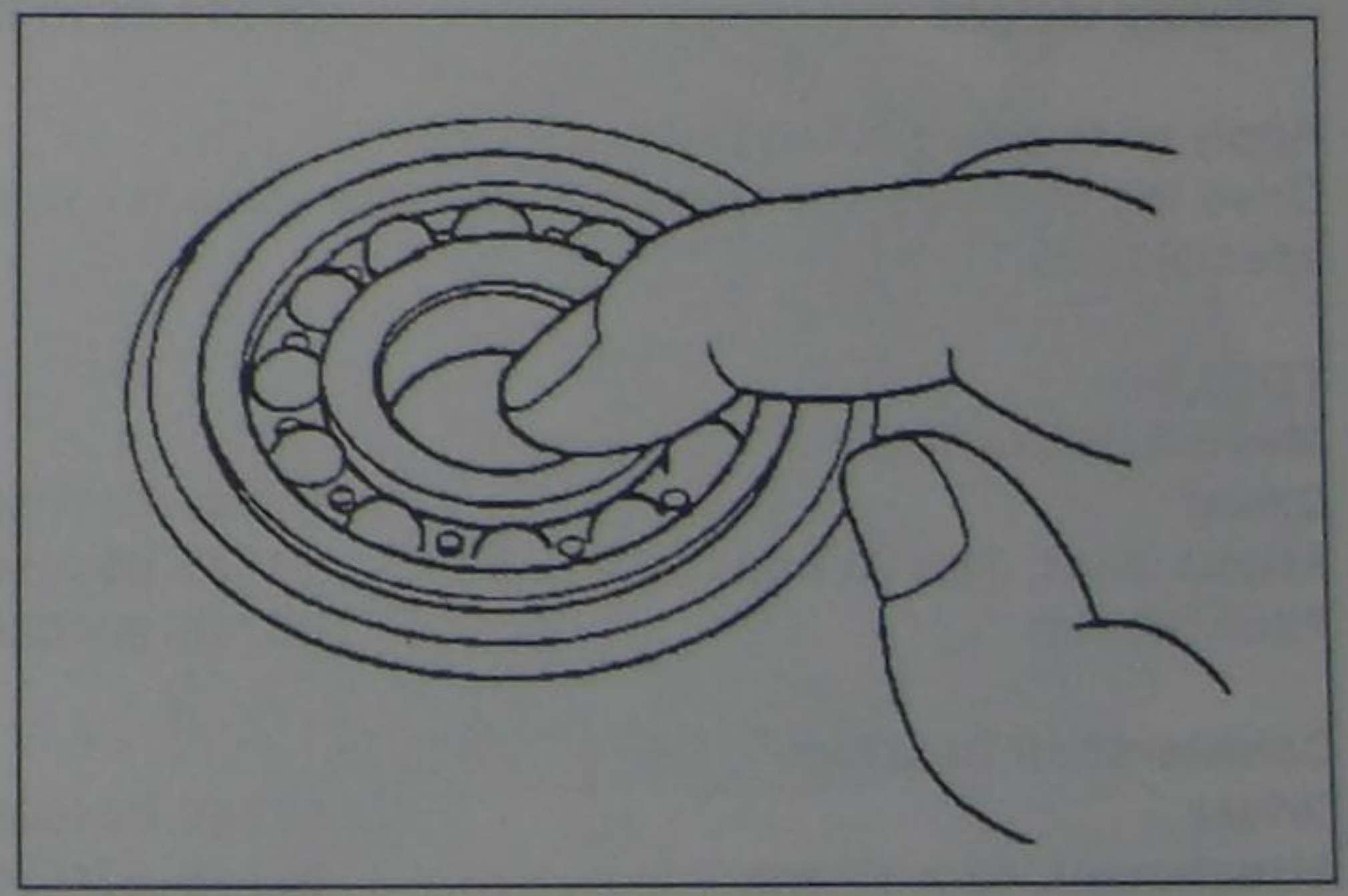


## Crankcase Bearing Replacement

Remove the following
- Transmission (page 11-4)
- Crankshaft (page 11-8)

Turn the inner race of each transmission bearing with your finger. The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the crankcase.

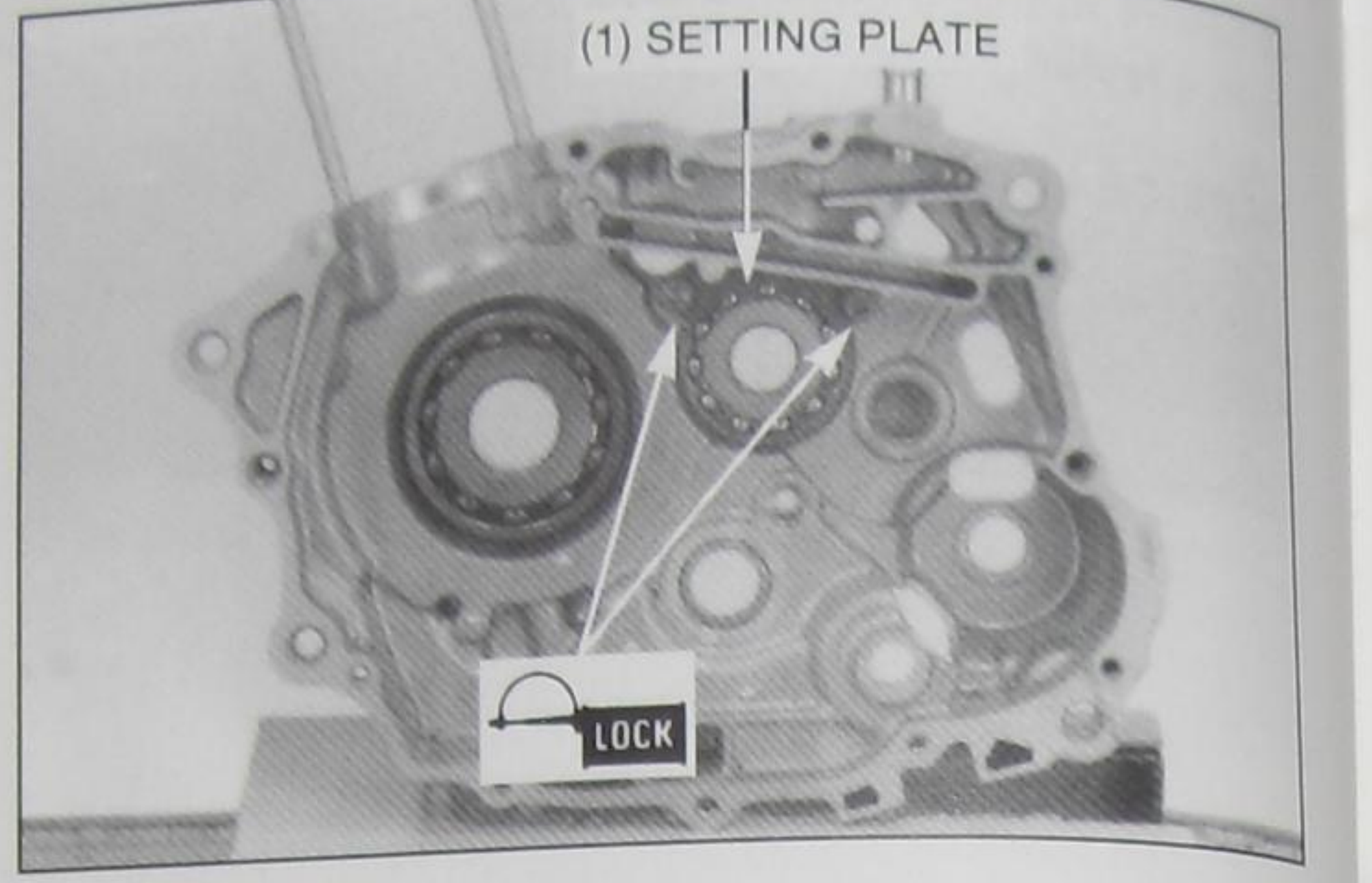
Replace the bearing if  the inner race does turn smoothly, quietly, or if the outer race fit loosely in the crankcase.



Before removing the bearings, heat the crankcase evenly using a heat gun.

CAUTION

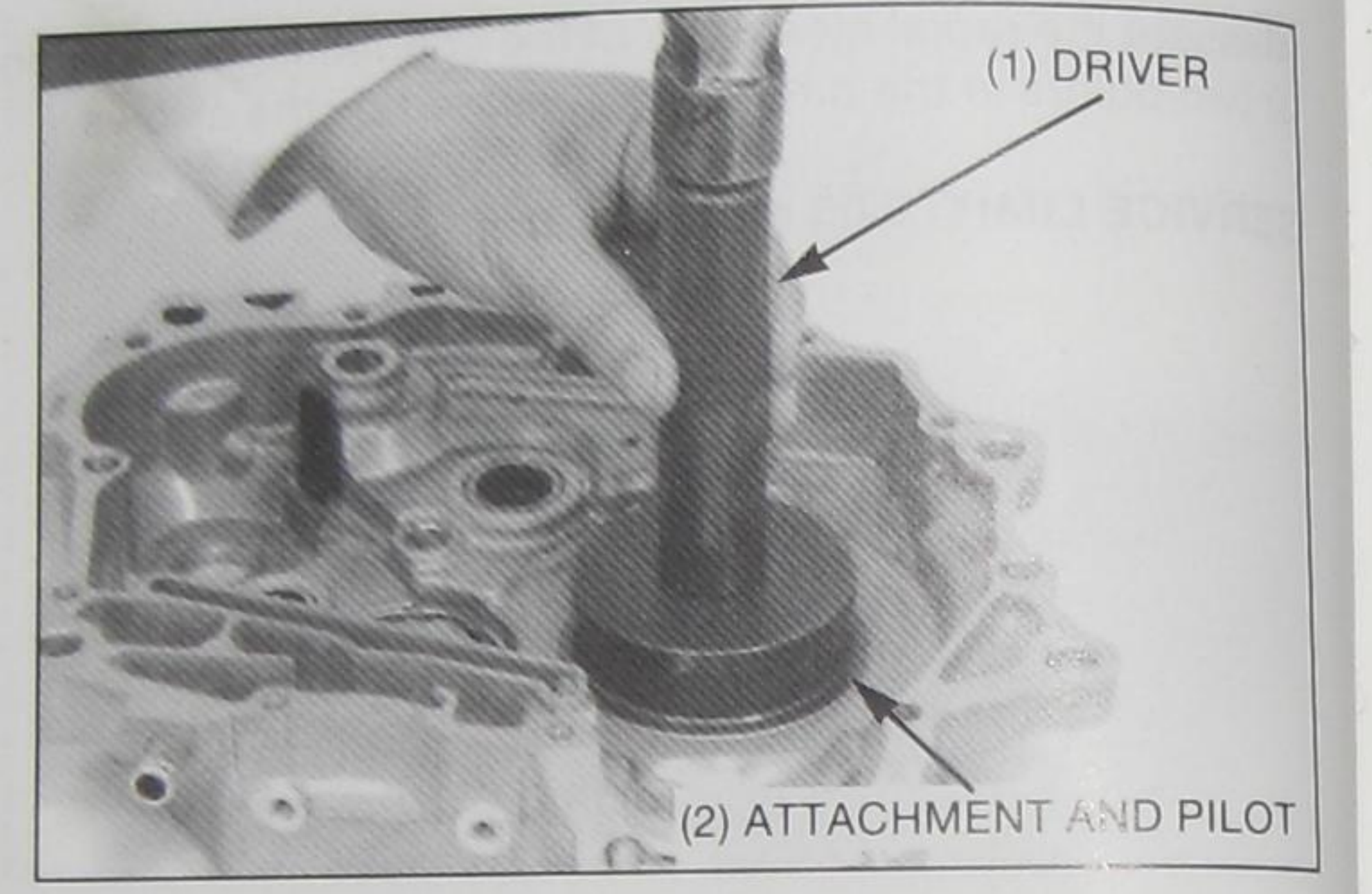
- **Always wear insulated groves when handling a heated crankcase.**
- **Be careful not to damage the crankcase mating surfaces.**



### RIGHT CRANKCASE BEARINGS

Remove the two bolts and mainshaft bearing setting plate.
Drive the bearings out of the right crankcase.

Apply oil to new bearing cavities.
Drive the bearings into the right crankcase using following special tools.



**TOOLS:**

| | |
|---|---|
| **Crankshaft bearing:** | |
| **Driver** | **07749-0010000** |
| **Attachment, 72 x 75 mm** | **07746-0010600** |
| **Pilot, 28 mm** | **07746-0041100** |
| **Mainshaft bearing:** | |
| **Driver** | **07749-0010000** |
| **Attachment, 52 x 55 mm** | **07746-0010400** |
| **Pilot, 20 mm** | **07746-0040500** |

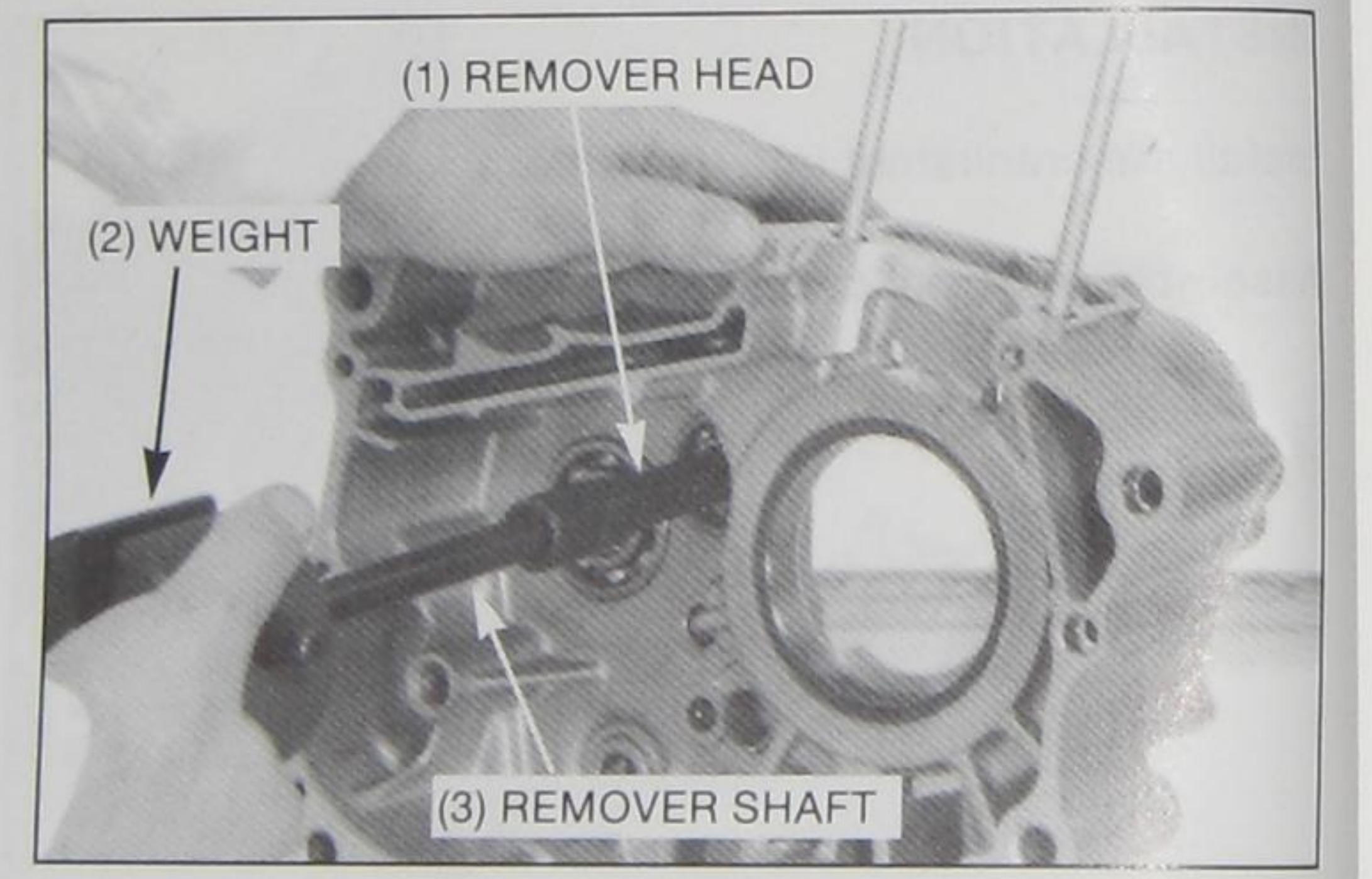
Apply locking agent to the bearing setting plate bolt threads.
Install the setting plate and tighten the bolts.

**TORQUE: 12 N·m (1.2 kgf-m, 9 lbf-ft)**

### LEFT CRANKCASE BEARINGS

Remove the countershaft oil seal.
Drive the countershaft bearing out of the left crankcase.

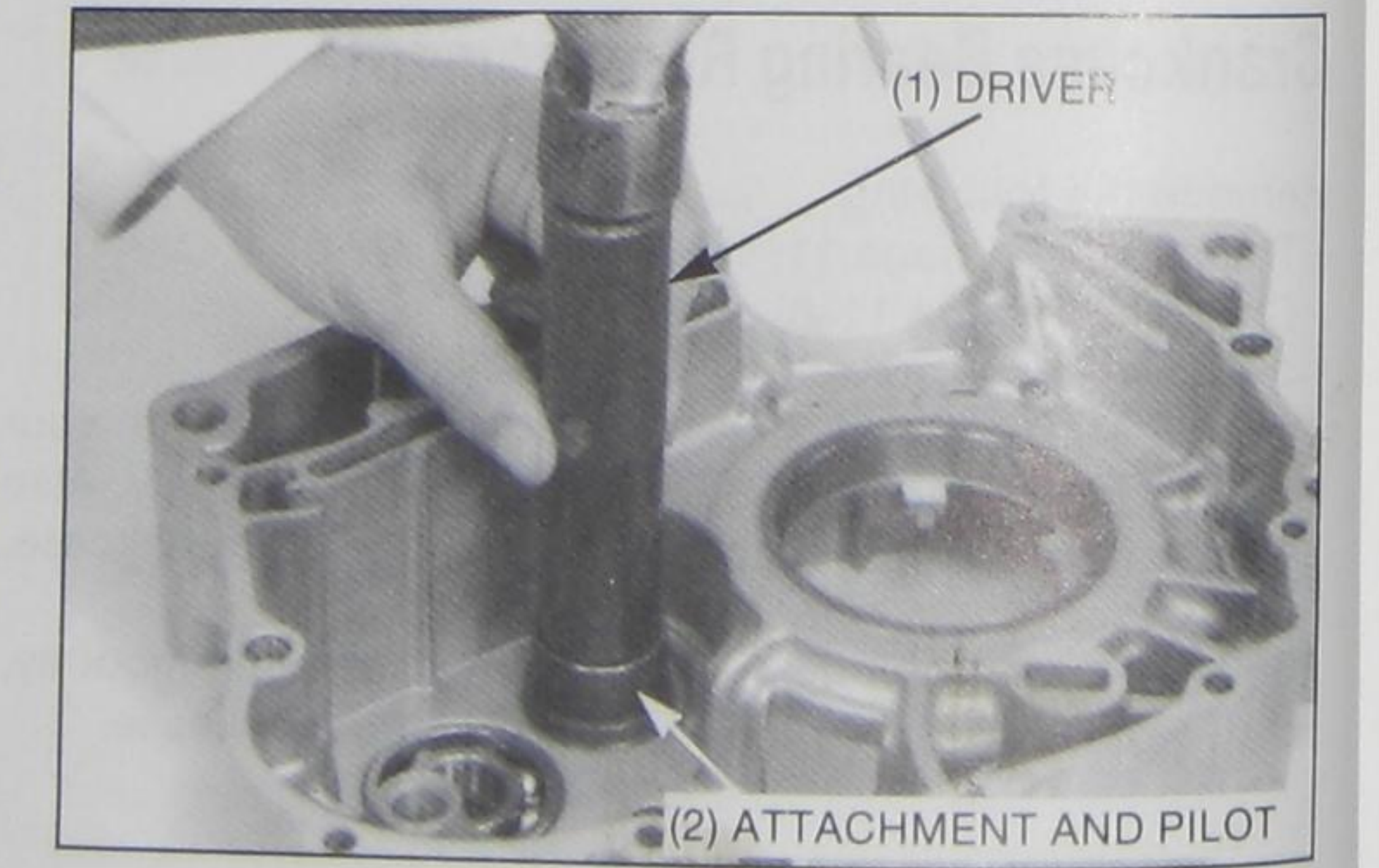
Remove the mainshaft bearing with the following special tools.



**TOOLS:**

| | |
|---|---|
| **Bearing remover set, 15 mm** | |
| **- Remover shaft** | **07936-KC10100** |
| **- Remover head** | **07936-KC10200** |
| **- Sliding weight** | **07741-0010201** |

Apply oil to new bearing cavities.
Drive the bearings into the left crankcase using following special tools.



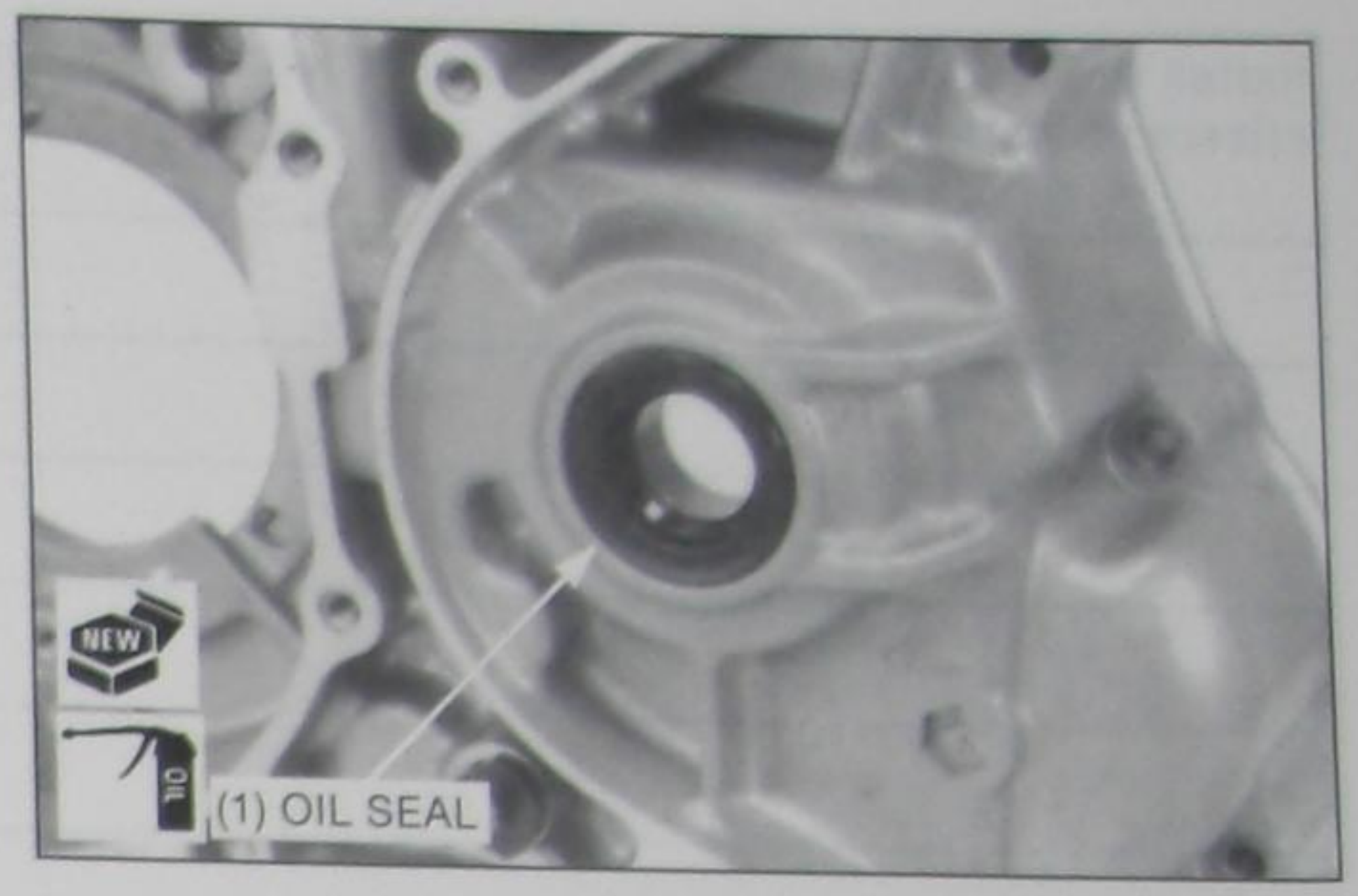
**TOOLS:**

| | |
|---|---|
| **Mainshaft bearing:** | |
| **Driver** | **07749-0010000** |
| **Attachment, 32 x 35 mm** | **07746-0010100** |
| **Pilot, 15 mm** | **07746-0040300** |
| **Countershaft bearing:** | |
| **Driver** | **07749-0010000** |
| **Attachment, 42 x 47 mm** | **07746-0010300** |
| **Pilot, 20 mm** | **07746-0040500** |

---

Apply oil to a new countershaft oil seal.
Install the oil seal until it is flush with the crankcase surface.

Install the following:
- Transmission (page 11-6)
- Crankshaft (page 11-9).

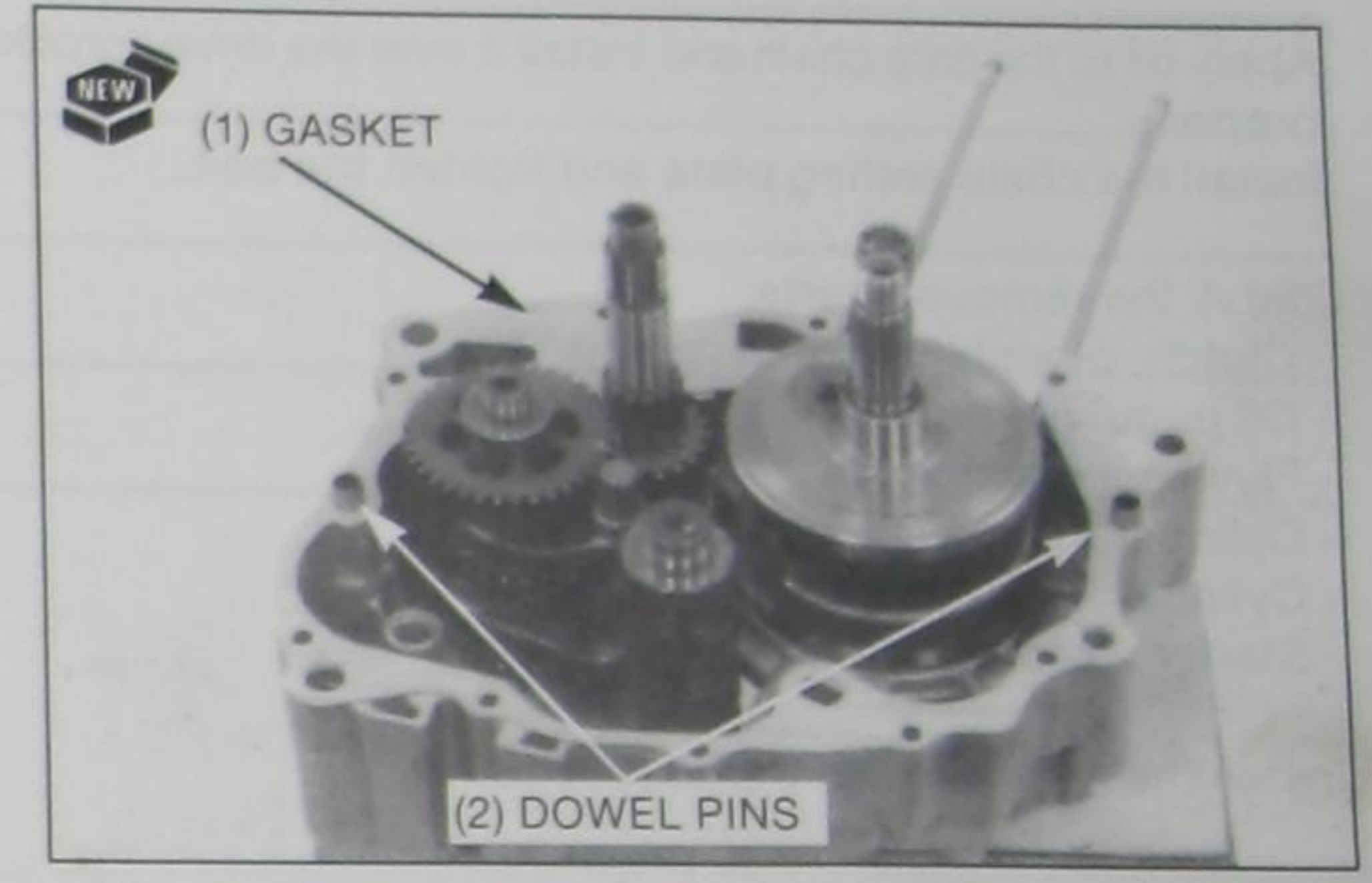


## Crankcase Assembly

Clean the crankcase mating surfaces thoroughly, being careful not to damage them.
Dress any roughness or irregularities with an oil stone.

Make sure all parts are installed in the left crankcase.

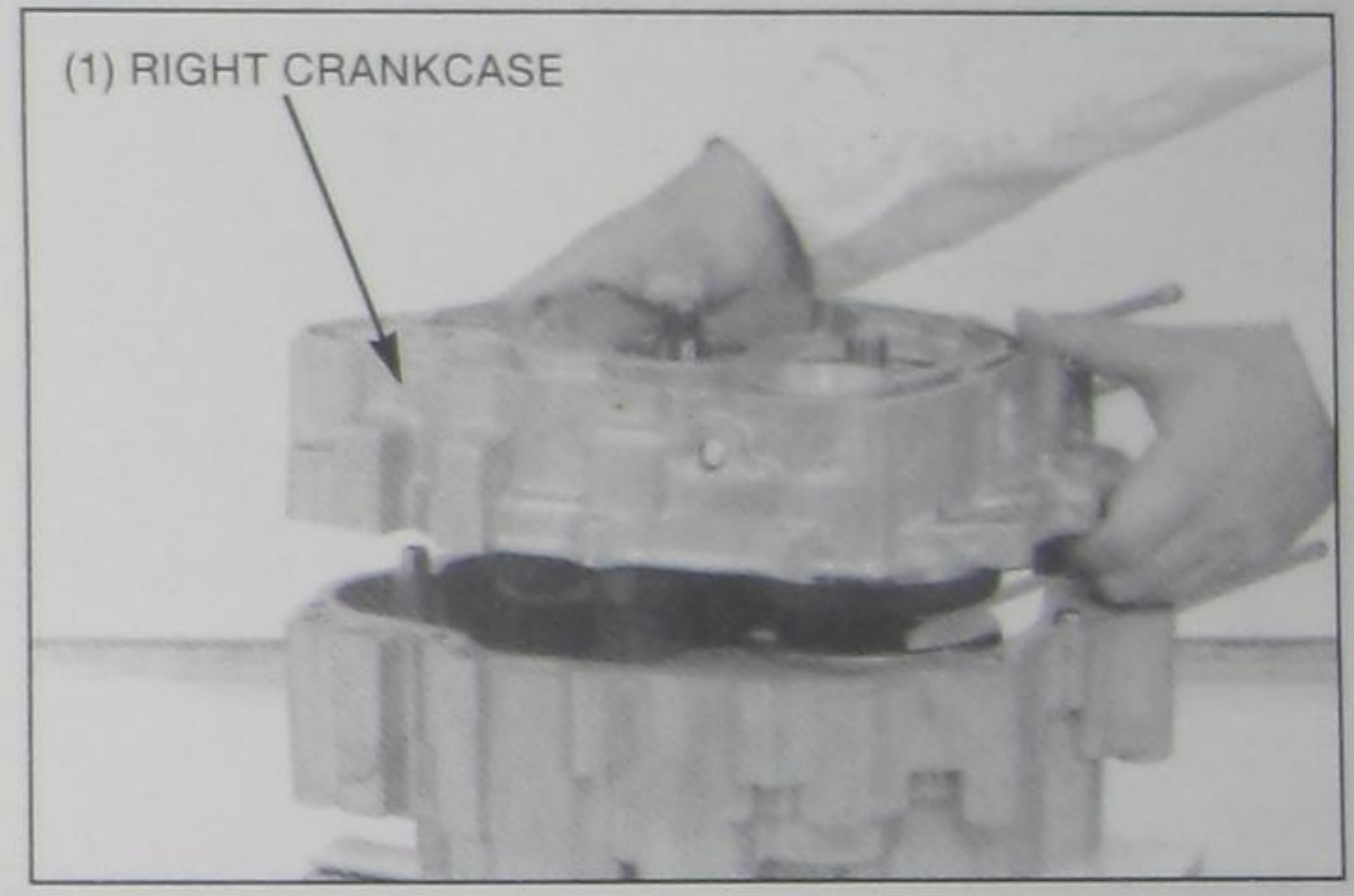
Install the dowel pins and a new gasket onto the left crankcase.



Install the right crankcase over the left crankcase.

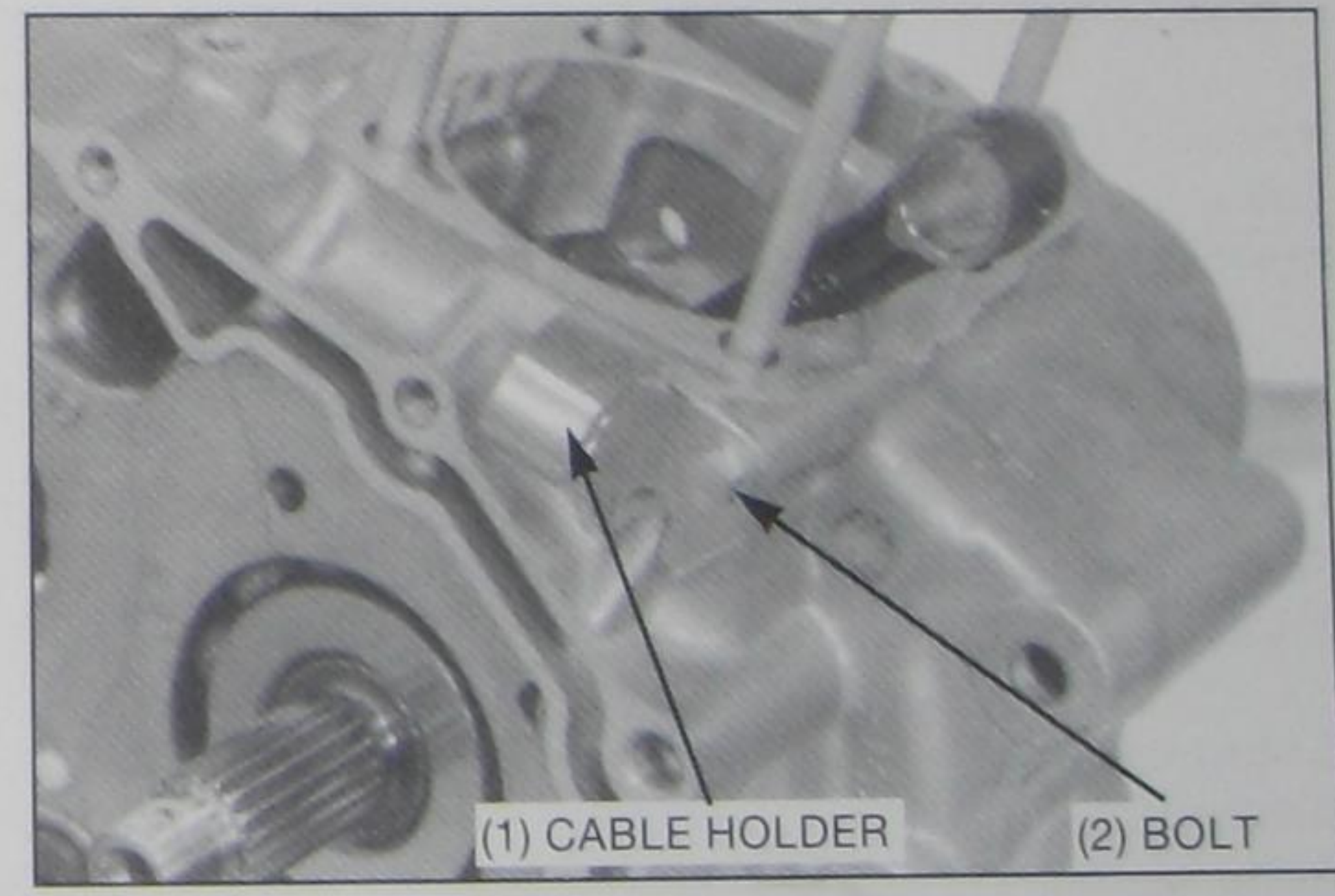
CAUTION

- **Do not force the crankcase halves together; if there is excessive force required, something is wrong. Remove the right crankcase and check for misaligned parts.**

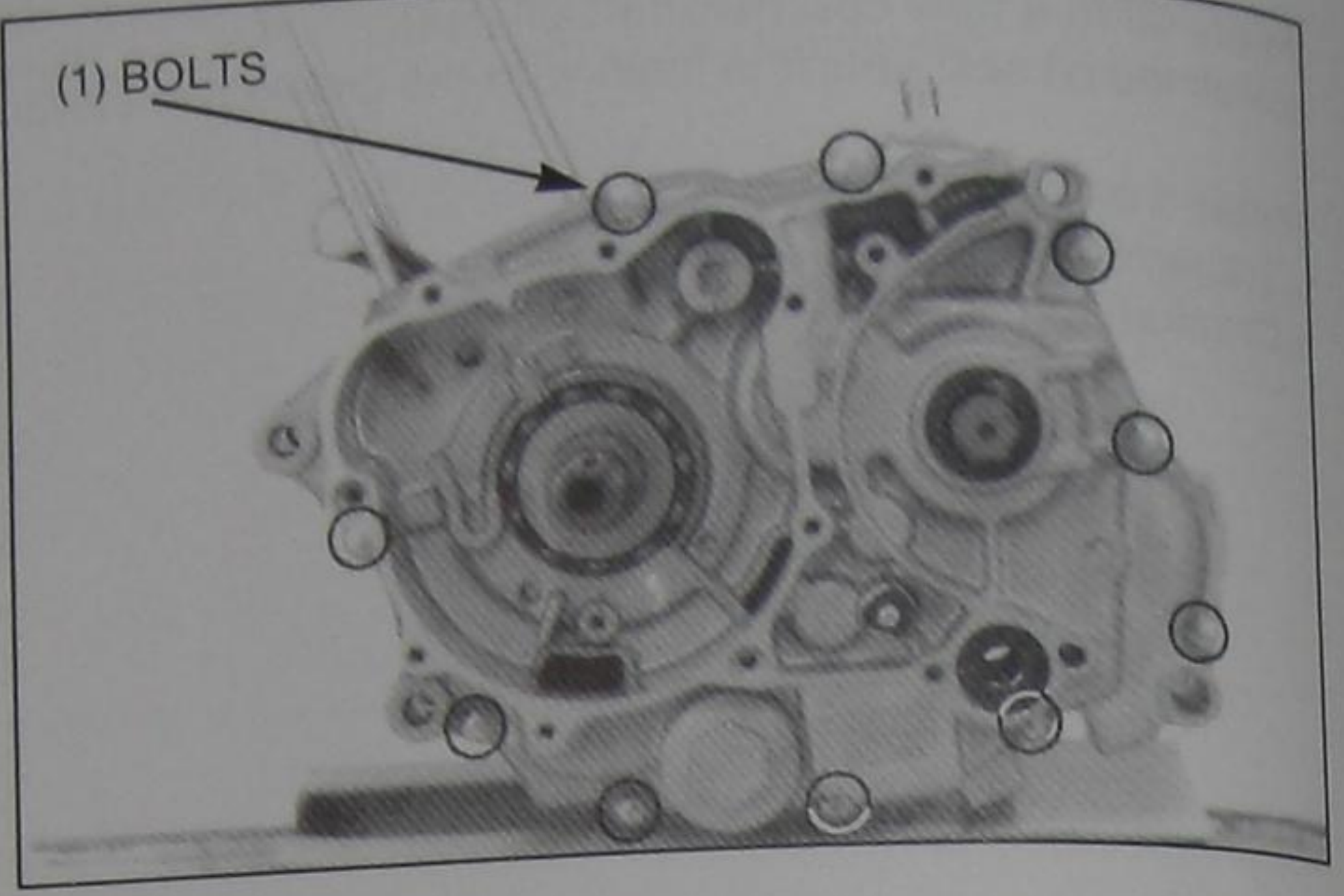


Make sure that the crankcase mating surfaces are touched evenly.

Install the right crankcase bolt with clutch cable holder and tighten it.



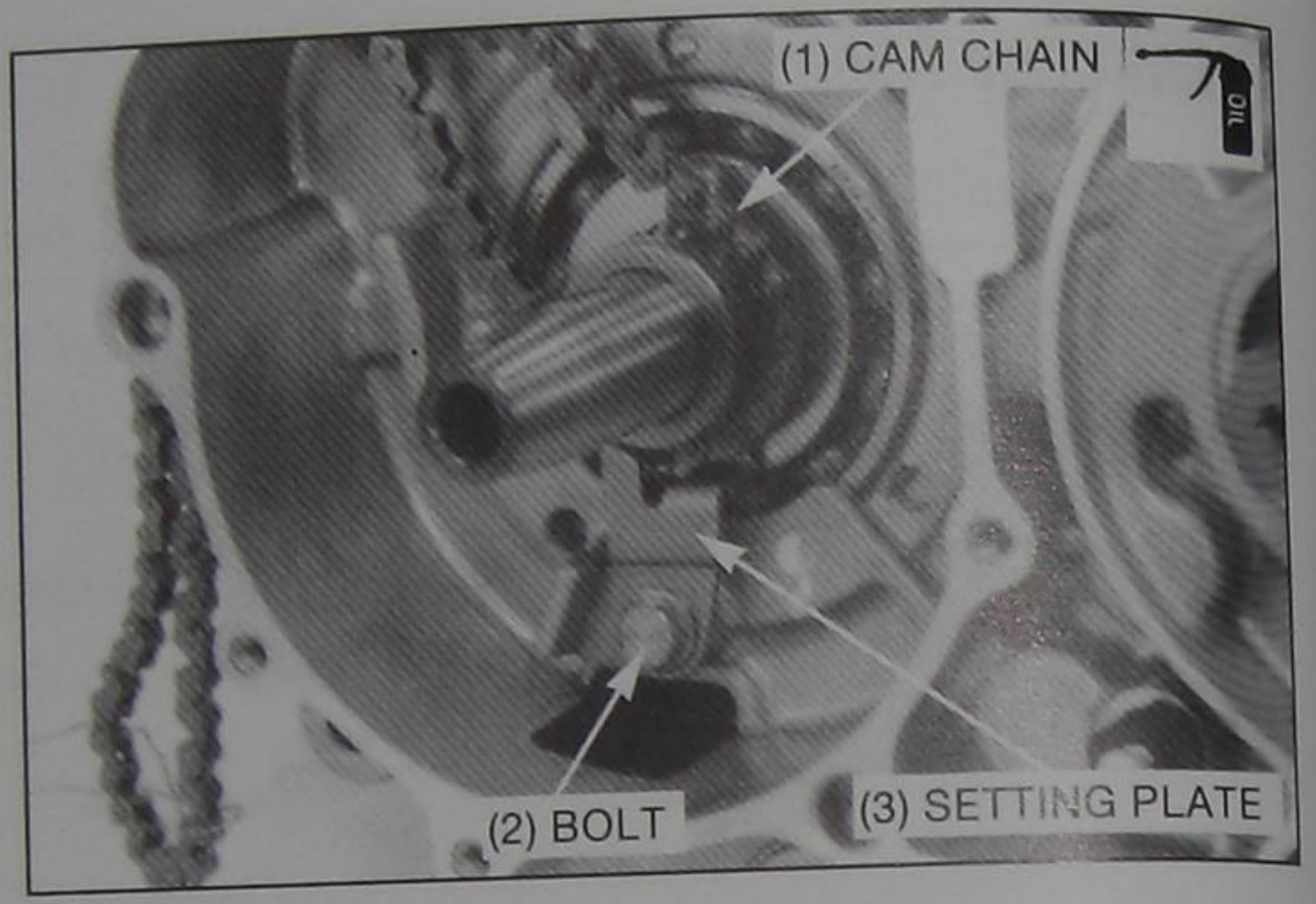
Install the ten left crankcase bolts and tighten them in a crisscross pattern in several steps.



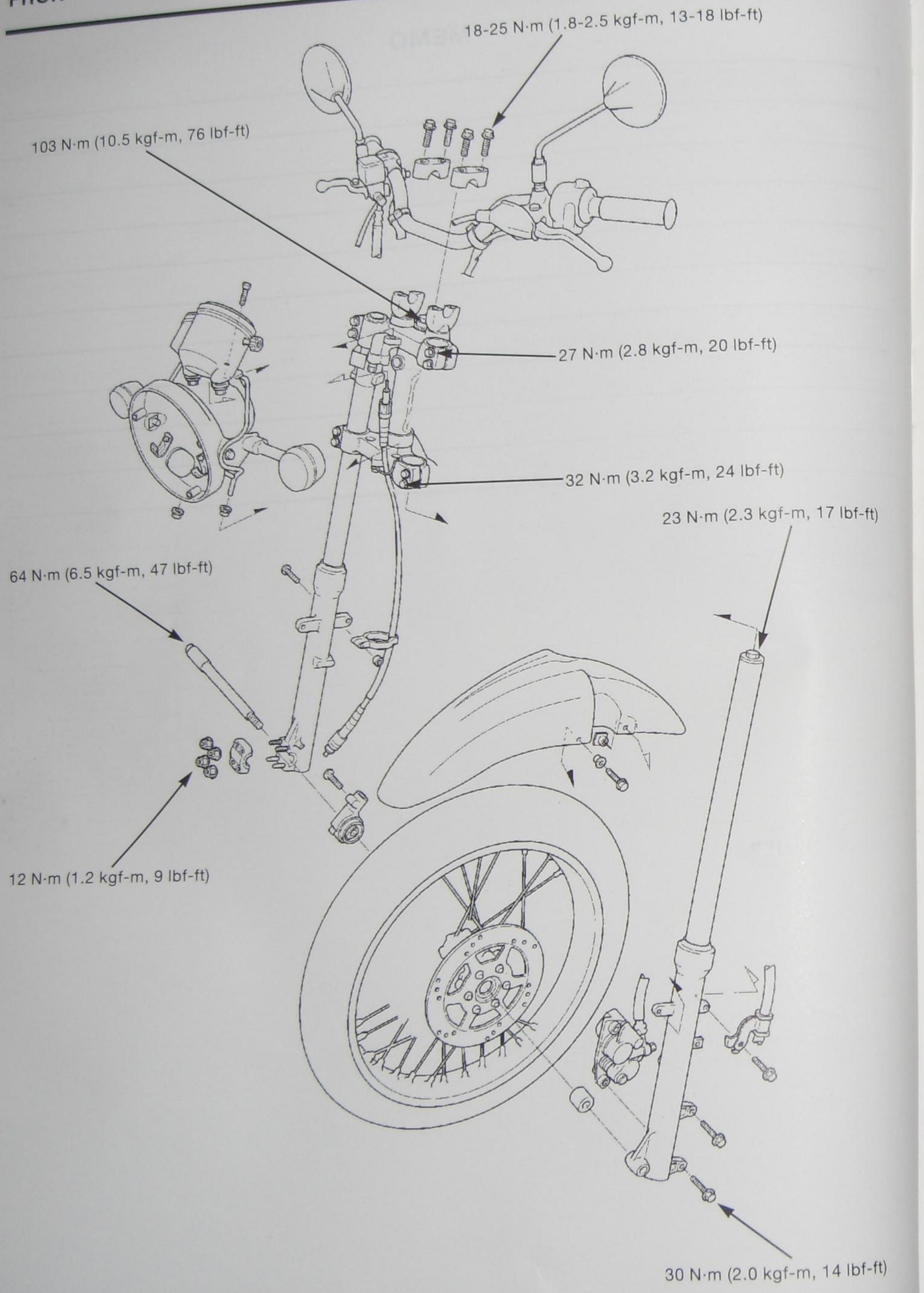
Apply oil to the cam chain and install it over the drive sprocket properly.
Install the chain setting plate and tighten the bolt.

Install the removed parts:
- Clutch, gearshift linkage (section 9)
- Oil pump (section 4)
- Flywheel (section 10)
- Cylinder, piston (section 8)
- Cylinder head (section 7)
- Starter motor (section 17)

Install the engine in the frame (section 6).



## MEMO


18-25 N·m (1.8-2.5 kgf-m, 13-18 lbf-ft)
103 N·m (10.5 kgf-m, 76 lbf-ft)
27 N·m (2.8 kgf-m, 20 lbf-ft)
32 N·m (3.2 kgf-m, 24 lbf-ft)
23 N·m (2.3 kgf-m, 17 lbf-ft)
64 N·m (6.5 kgf-m, 47 lbf-ft)
12 N·m (1.2 kgf-m, 9 lbf-ft)
30 N·m (2.0 kgf-m, 14 lbf-ft)

# 12. Front Wheel/Suspension/Steering

| | | | |
|---|---|---|---|
| SERVICE INFORMATION | 12-1 | FORK | 12-7 |
| TROUBLESHOOTING | 12-2 | HANDLEBAR | 12-14 |
| FRONT WHEEL | 12-3 | STEERING STEM | 12-17 |

## Service Information

### GENERAL

**⚠ WARNING**

- **Riding on damaged rim or spokes impairs safe operation of the vehicle.**
- **A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.**

- A hoist or equivalent is required to support the motorcycle when servicing the front wheel, fork and steering stem.
- Refer to section 14 for hydraulic brake system service.
- Refer to section 18 for light, meter and switch service.

### SPECIFICATIONS

Unit: mm (in)

| Item | | Standard | Service Limit |
|---|---|---|---|
| Minimum tire tread depth | | — | 3.0 (0.12) |
| Cold tire pressure | Driver only | 175 kPa (1.75 kgf/cm², 25 psi) | — |
| | Driver and passenger | 175 kPa (1.75 kgf/cm², 25 psi) | — |
| Front axle runout | | — | 0.20 (0.008) |
| Front wheel rim runout | Radial | — | 2.0 (0.08) |
| | Axial | — | 2.0 (0.08) |
| Fork spring free length | | 587.6 (23.13) | 579.3 (22.81) |
| Fork tubes runout | | — | 0.20 (0.008) |
| Fork fluid capacity | | 384 cm³ (12.9 US oz, 13.5 Imp oz) | — |
| Fork fluid level | | 140 (5.5) | — |

### TORQUE VALUES

| | | |
|---|---|---|
| Brake disc bolt | 20 N·m (3.1 kgf-m, 22 lbf-ft) | ALOC bolt: replace with a new one |
| Front axle | 64 N·m (6.5 kgf-m, 47 lbf-ft) | |
| Front axle holder nut | 12 N·m (1.2 kgf-m, 9 lbf-ft) | U-nut |
| Spoke nipple | 4 N·m (0.4 kgf-m, 2.9 lbf-ft) | |
| Fork socket bolt | 20 N·m (2.0 kgf-m, 14 lbf-ft) | Apply locking agent to the threads |
| Fork cap | 23 N·m (2.3 kgf-m, 17 lbf-ft) | |
| Fork top bridge pinch bolt | 27 N·m (2.8 kgf-m, 20 lbf-ft) | |
| Fork bottom bridge pinch bolt | 32 N·m (3.2 kgf-m, 24 lbf-ft) | |
| Brake caliper mounting bolt | 30 N·m (2.0 kgf-m, 14 lbf-ft) | ALOC bolt: replace with a new one |
| Steering top thread | 5 N·m (0.5 kgf-m, 3.6 lbf-ft) | page 12-20 |
| Steering stem nut | 103 N·m (10.5 kgf-m, 76 lbf-ft) | |
| Handle holder bolt | 18-25 N·m (1.8-2.5 kgf-m, 13-18 lbf-ft) | |

## TOOLS

| | |
|---|---|
| Bearing remover shaft | 07746-0050100 |
| Bearing remover head, 15 mm | 07746-0050400 |
| Driver | 07749-0010000 |
| Attachment, 32 x 35 mm | 07746-0010100 |
| Attachment, 42 x 47 mm | 07746-0010300 |
| Pilot, 15 mm | 07746-0040300 |
| Fork seal driver | 07947-4630100 |
| Steering stem socket | 07916-KA50100 |
| Ball race remover | 07953-MJ10000 |
| - Remover attachment | 07953-MJ10100 |
| - Remover handle | 07953-MJ10200 |
| Steering stem driver | 07946-4300101 |
| Spoke wrench C, 5.8 x 6.1 mm | 07701-0020300 |

## Troubleshooting

**Hard steering**
- Steering top thread too tigh
- Worn or damaged steering head bearings
- Bent steering stem
- Insufficient tire pressure
- Faulty front tire

**Steers one side or does not track straight**
- Damaged or loose steering head bearings
- Bent forks
- Bent axle
- Wheel installed incorrectly
- Bent frame
- Worn or damaged wheel bearings
- Faulty front tire

**Front wheel wobbling**
- Bent rim
- Worn or damaged front wheel bearings
- Loose or broken spokes
- Faulty front tire
- Unbalanced front tire and wheel
- Wheel installed incorrectly

**Front wheel turns hard**
- Faulty front wheel bearings
- Bent front axle
- Front brake drag

**Soft suspension**
- Insufficient fluid in fork
- Incorrect fork fluid weight
- Deteriorated fork fluid
- Weak fork springs
- Insufficient tire pressure

**Hard suspension**
- Bent fork tubes
- Too much fluid in fork
- Incorrect fork fluid weight
- Clogged fork fluid passage

**Front suspension noise**
- Insufficient fluid in fork
- Loose fork fasteners

## Front Wheel

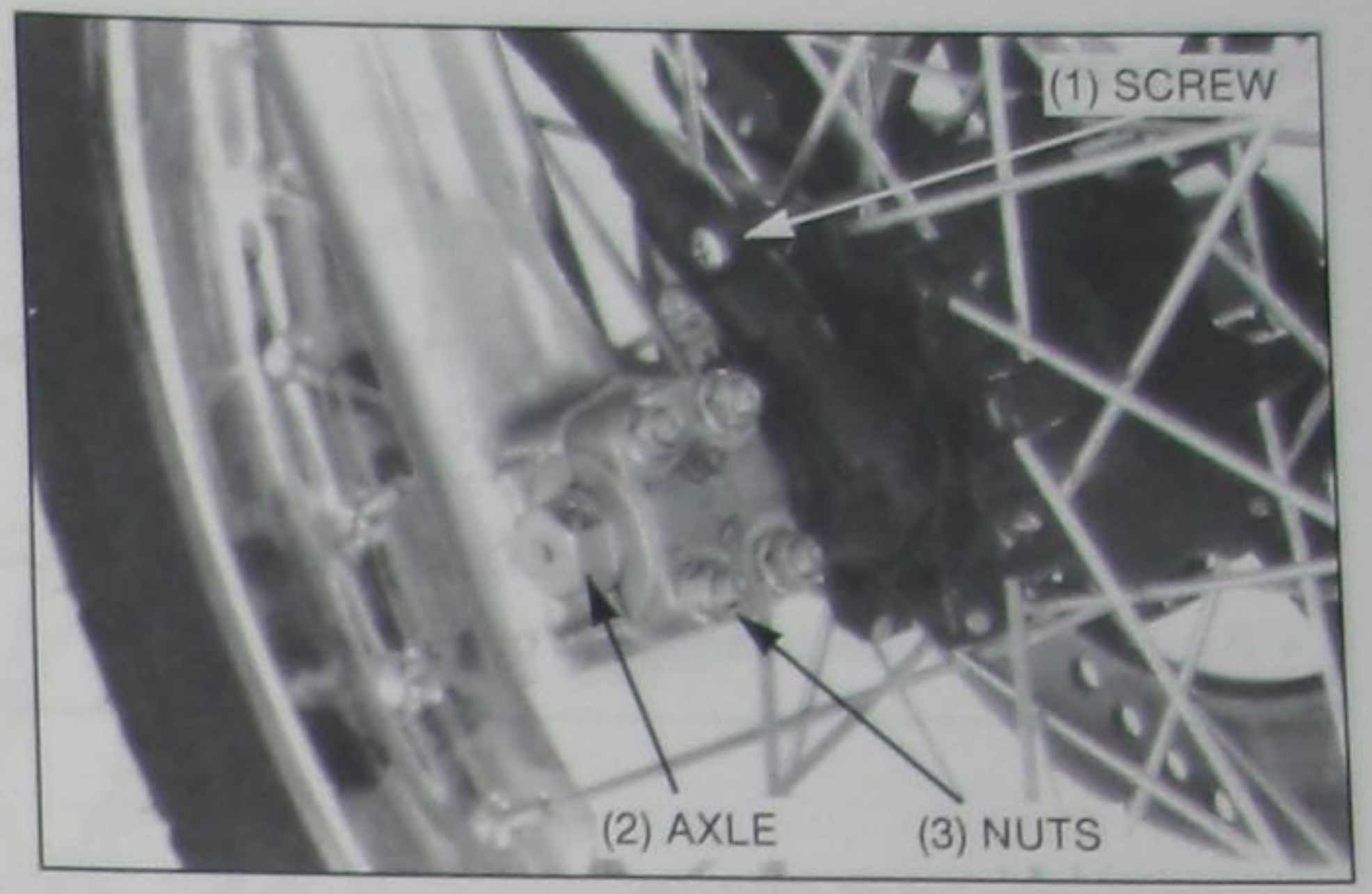
### REMOVAL

Remove the speedometer set screw and disconnect the speedometer cable.

Loosen the axle holder nuts.
Loosen the front axle.

Support the motorcycle securely using a hoist or equivalent and raise the front wheel off the ground.

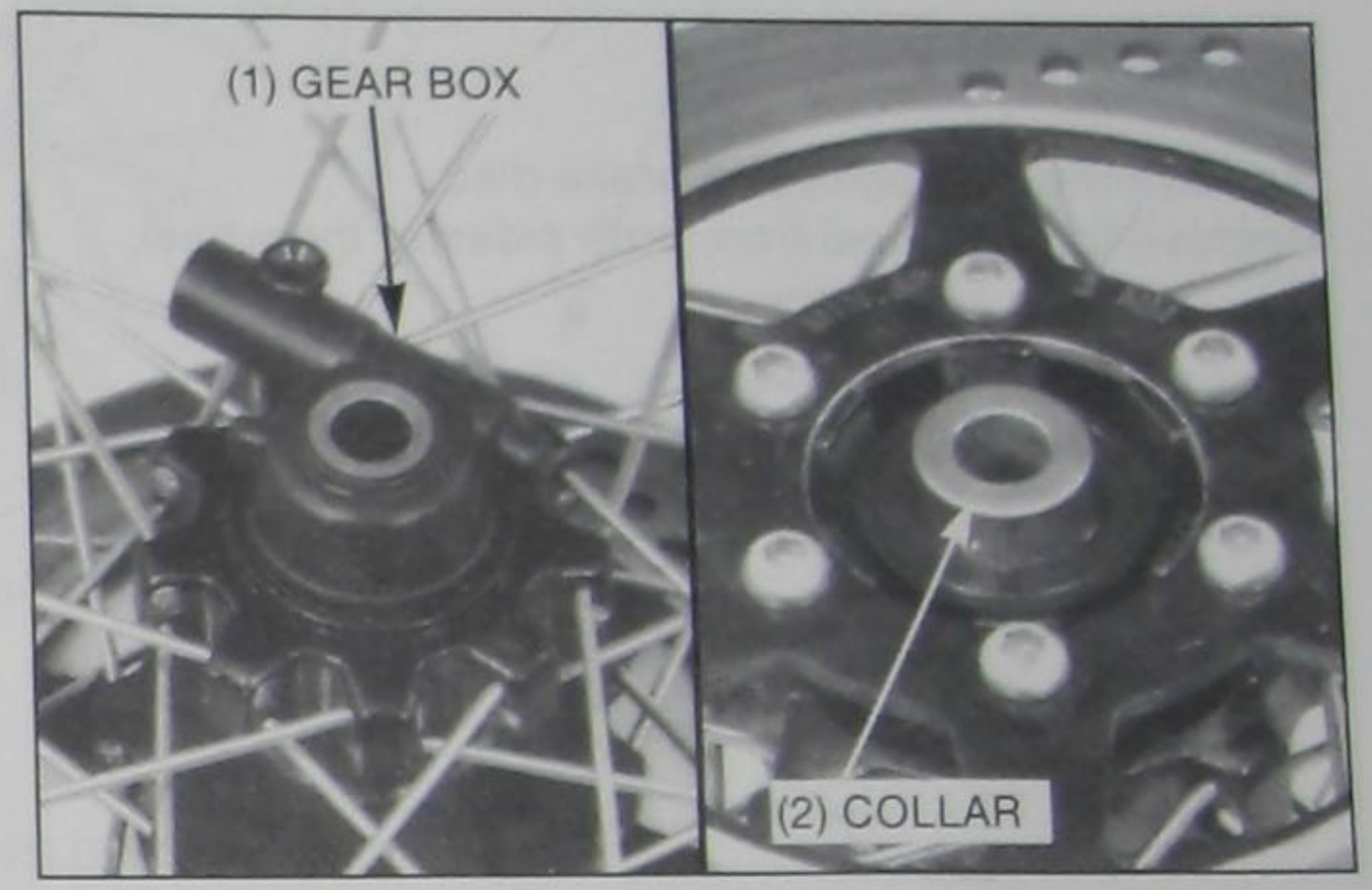
Remove the axle and the front wheel.



NOTE:

- Do not operate the brake lever after removing the wheel.

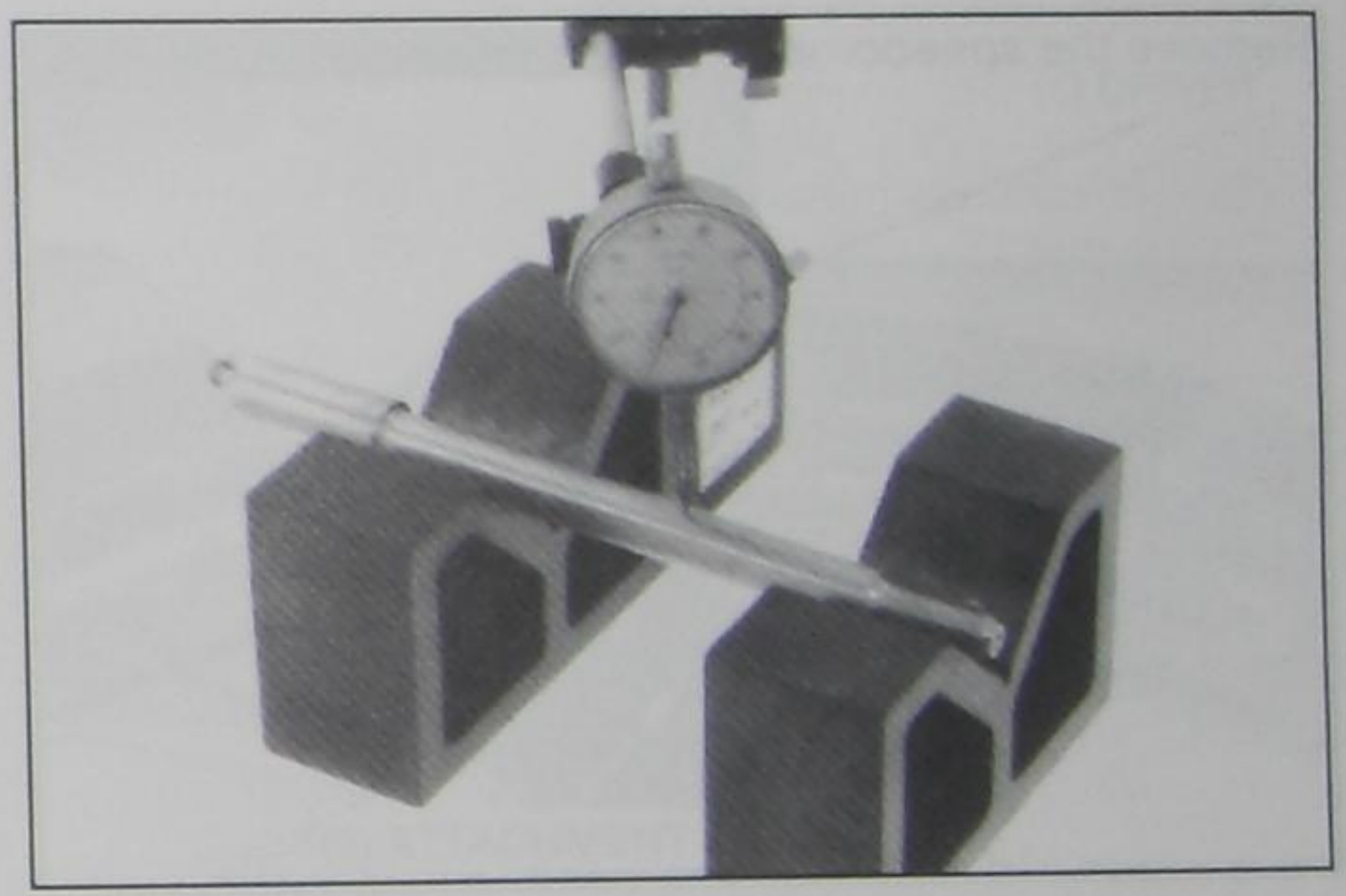
Remove the speedometer gear box and side collar.



### INSPECTION

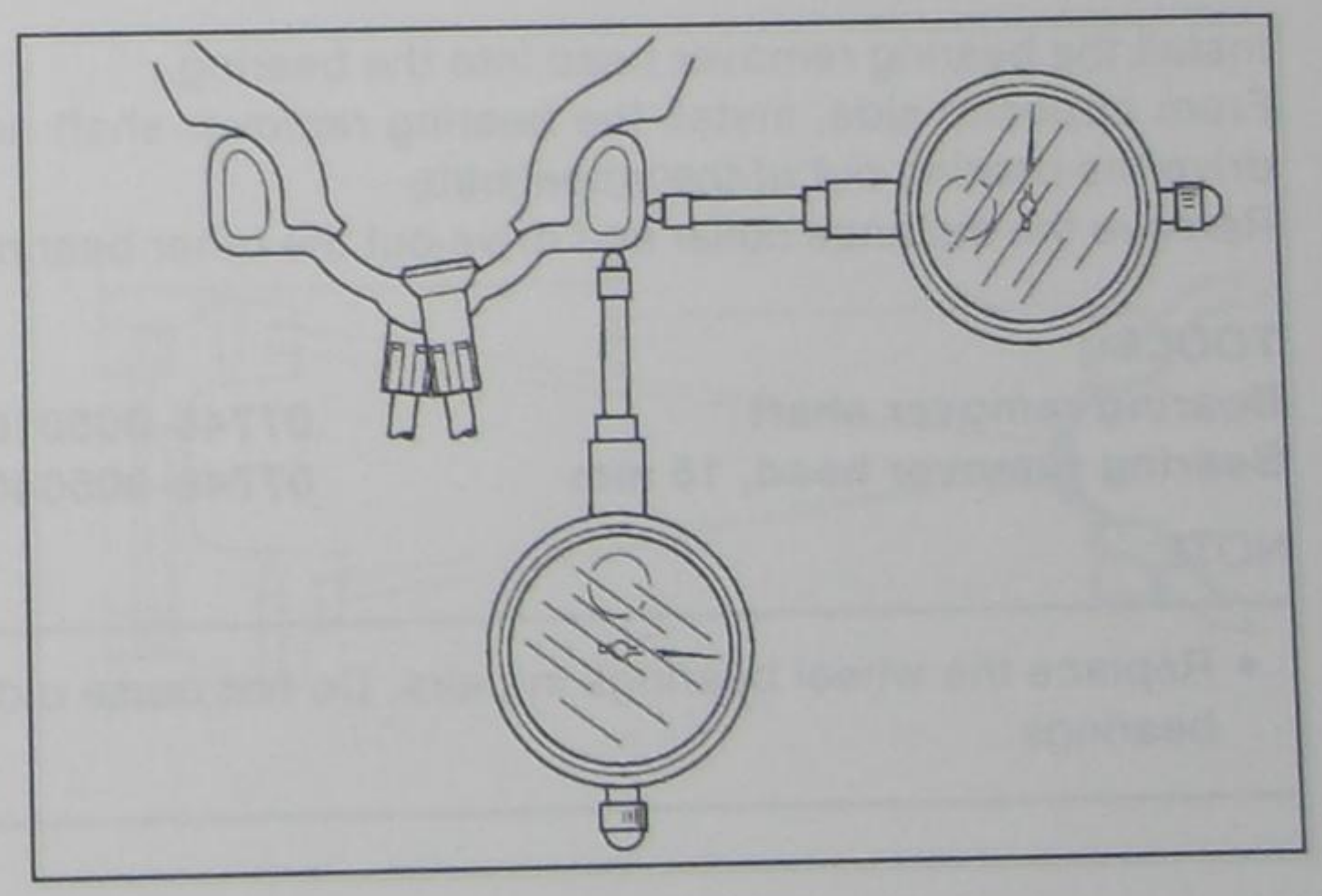
**AXLE**
Set the front axle in V-blocks.
Turn the front axle and measure the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

**SERVICE LIMIT: 0.20 mm (0.008 in)**



**WHEEL RIM**
Check the rim runout by placing the wheel in a truing stand.
Spin the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

**SERVICE LIMITS:** **Radial: 2.0 mm (0.08 in)**
**Axial: 2.0 mm (0.08 in)**



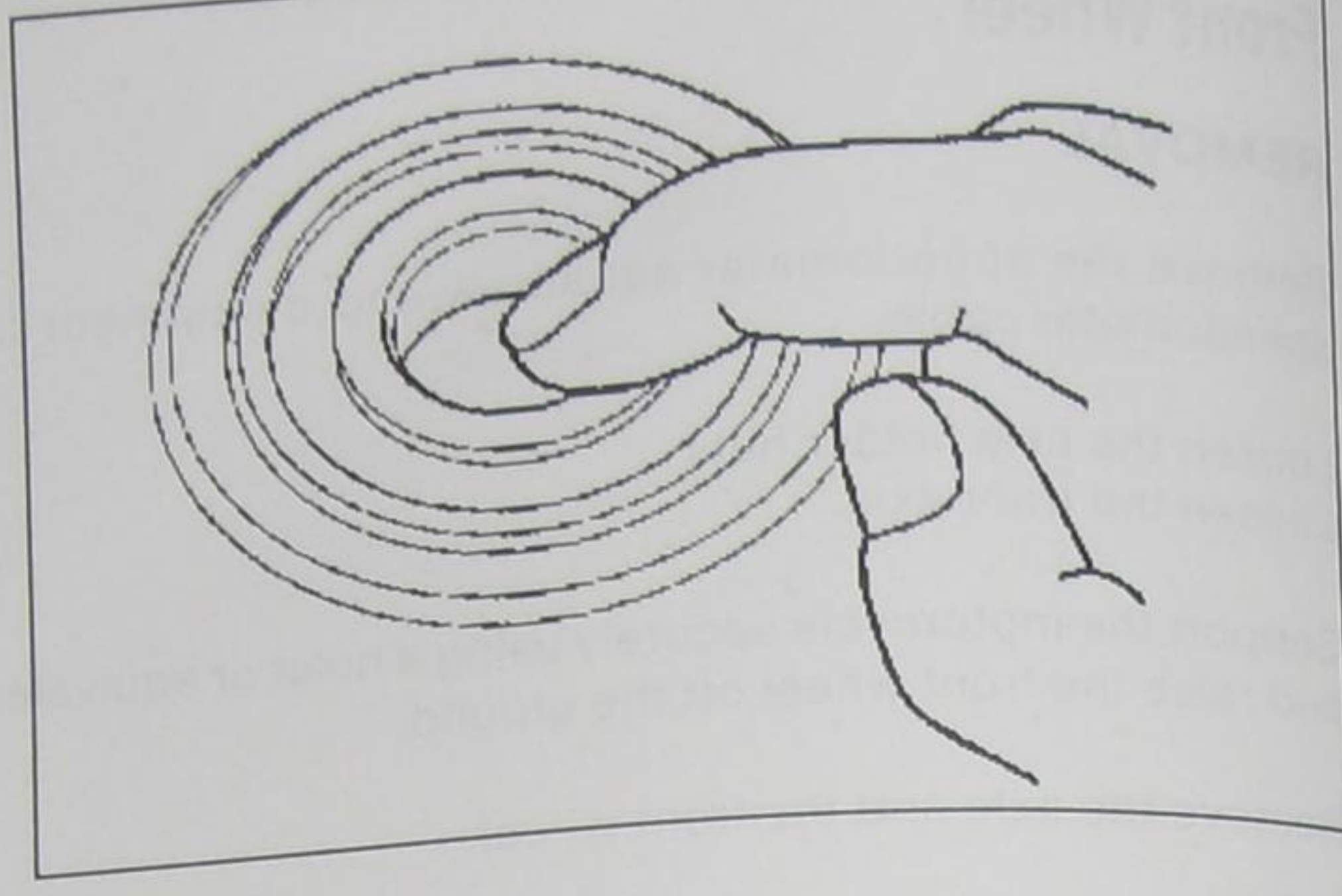
**WHEEL BEARING**

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if the races do not turn smoothly and quietly, if they fit loosely in the hub.

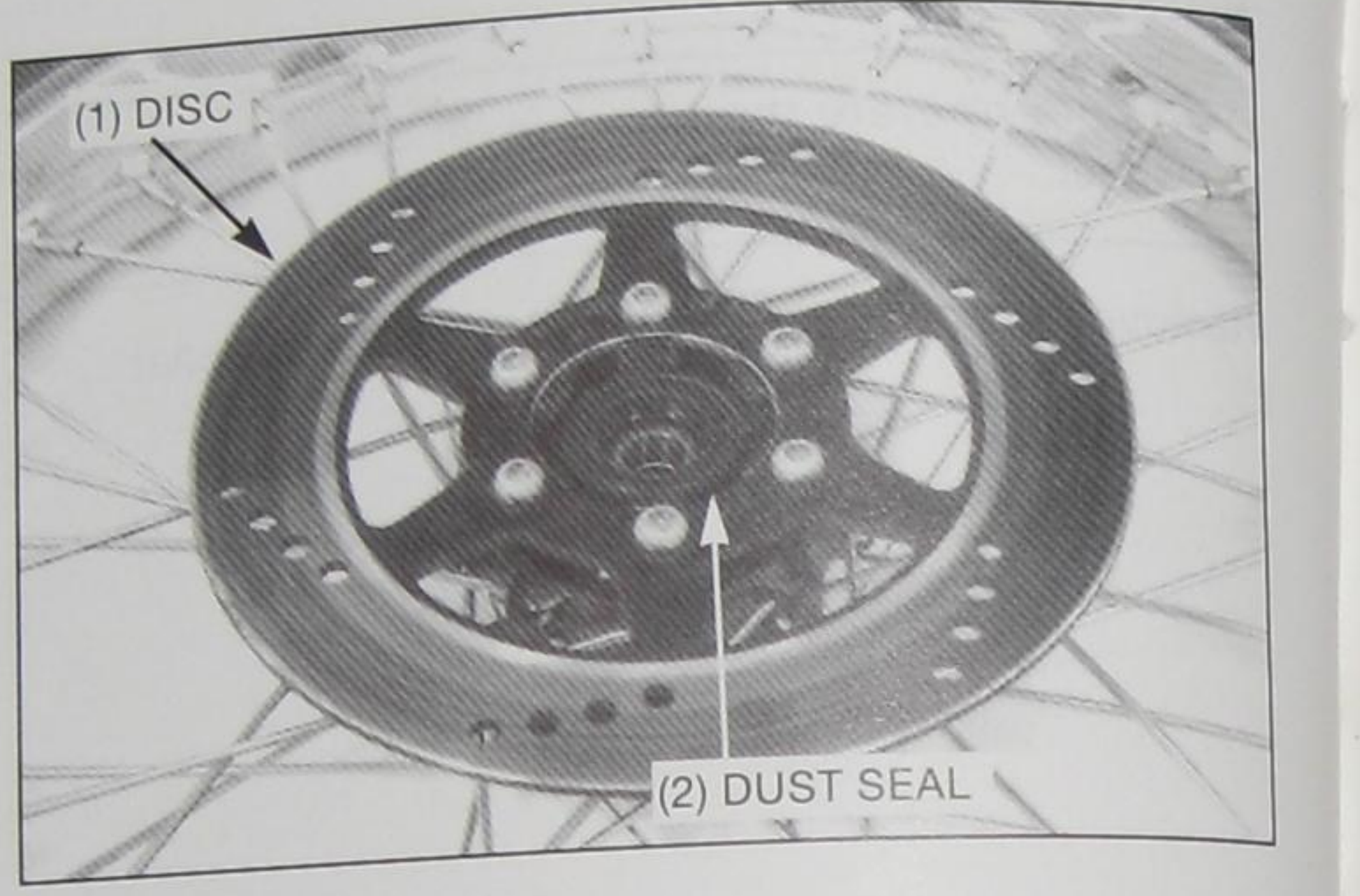
NOTE:

- Replace the wheel bearings in pairs.

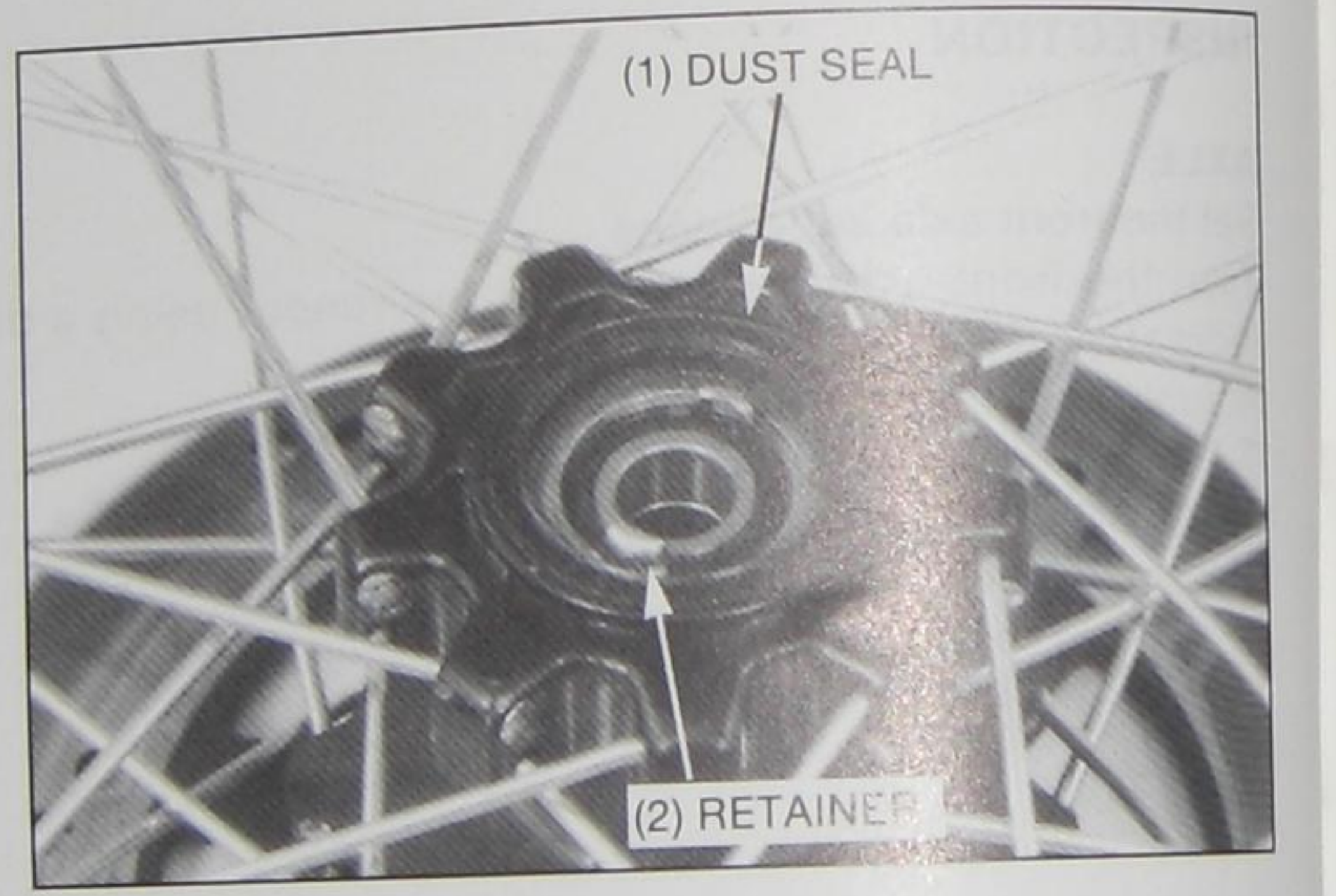


## DISASSEMBLY

Remove the disc bolts and brake disc.
Remove the dust seal from both sides of the wheel.


(1) DISC
(2) DUST SEAL

Remove the speedometer gear retainer.


(1) DUST SEAL
(2) RETAINER

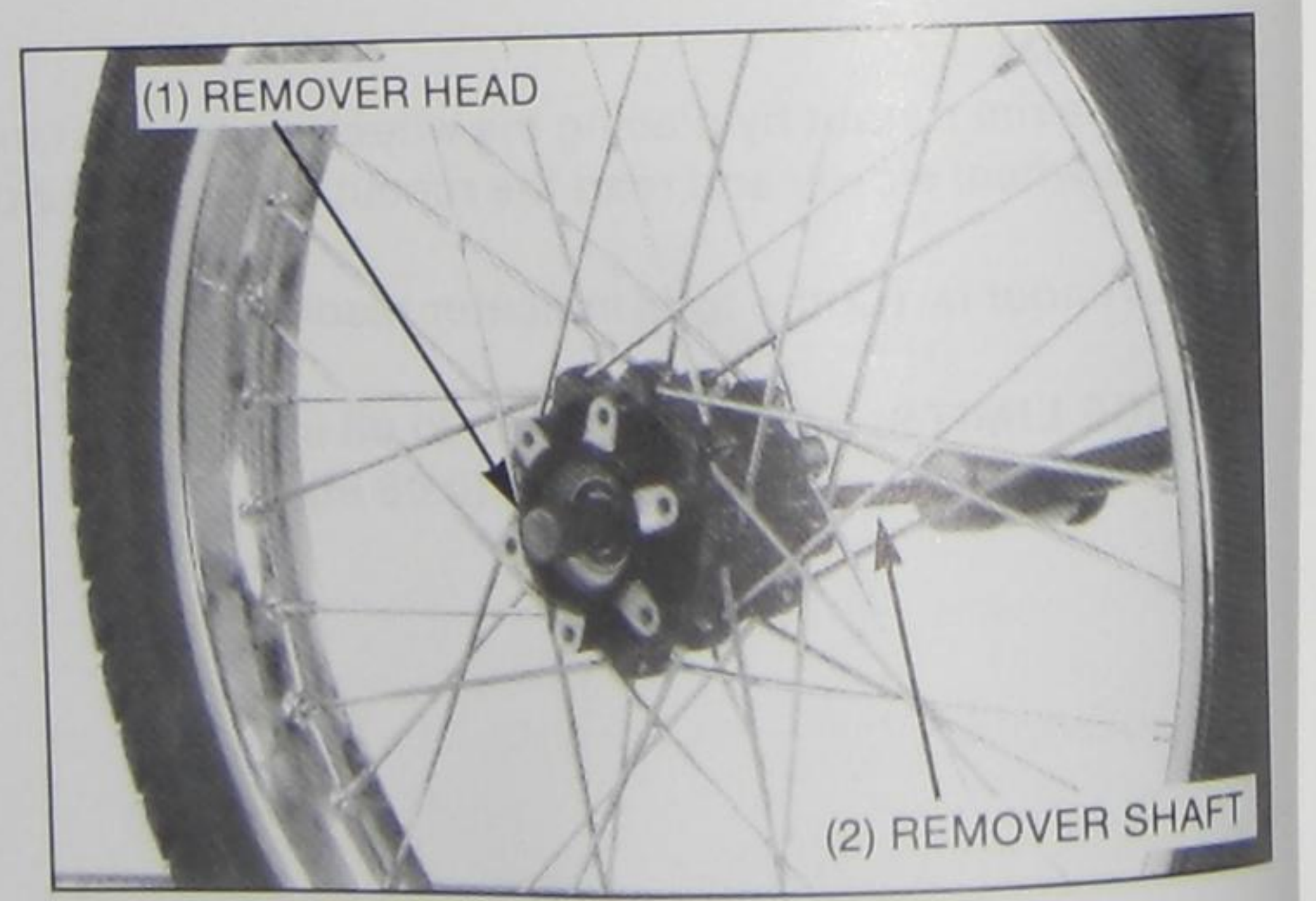
Install the bearing remover head into the bearing.
From opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

**TOOLS:**

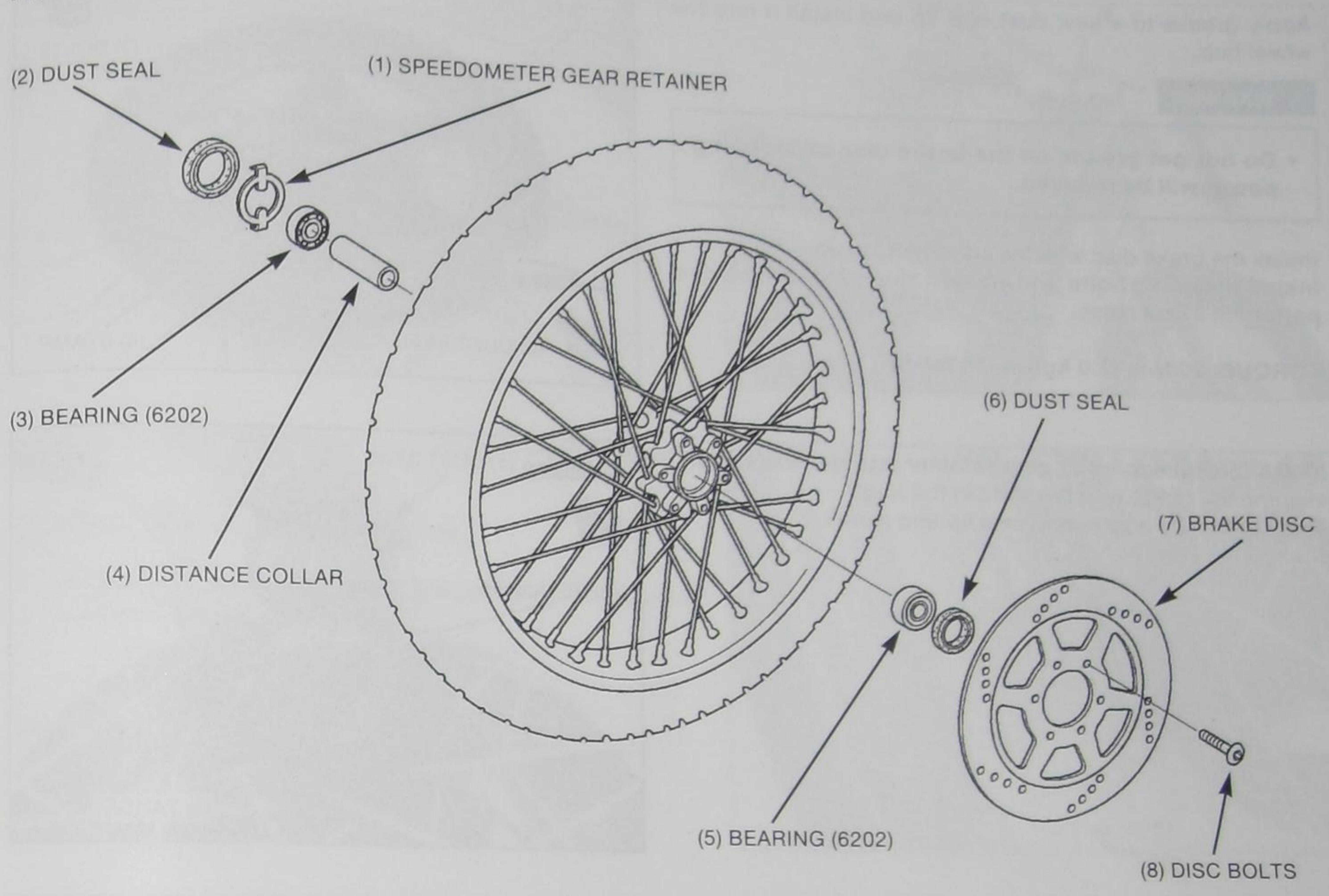
| | |
|---|---|
| **Bearing remover shaft** | **07746-0050100** |
| **Bearing remover head, 15 mm** | **07746-0050400** |

NOTE:

- Replace the wheel bearings in pairs. Do not reuse old bearings.


(1) REMOVER HEAD
(2) REMOVER SHAFT

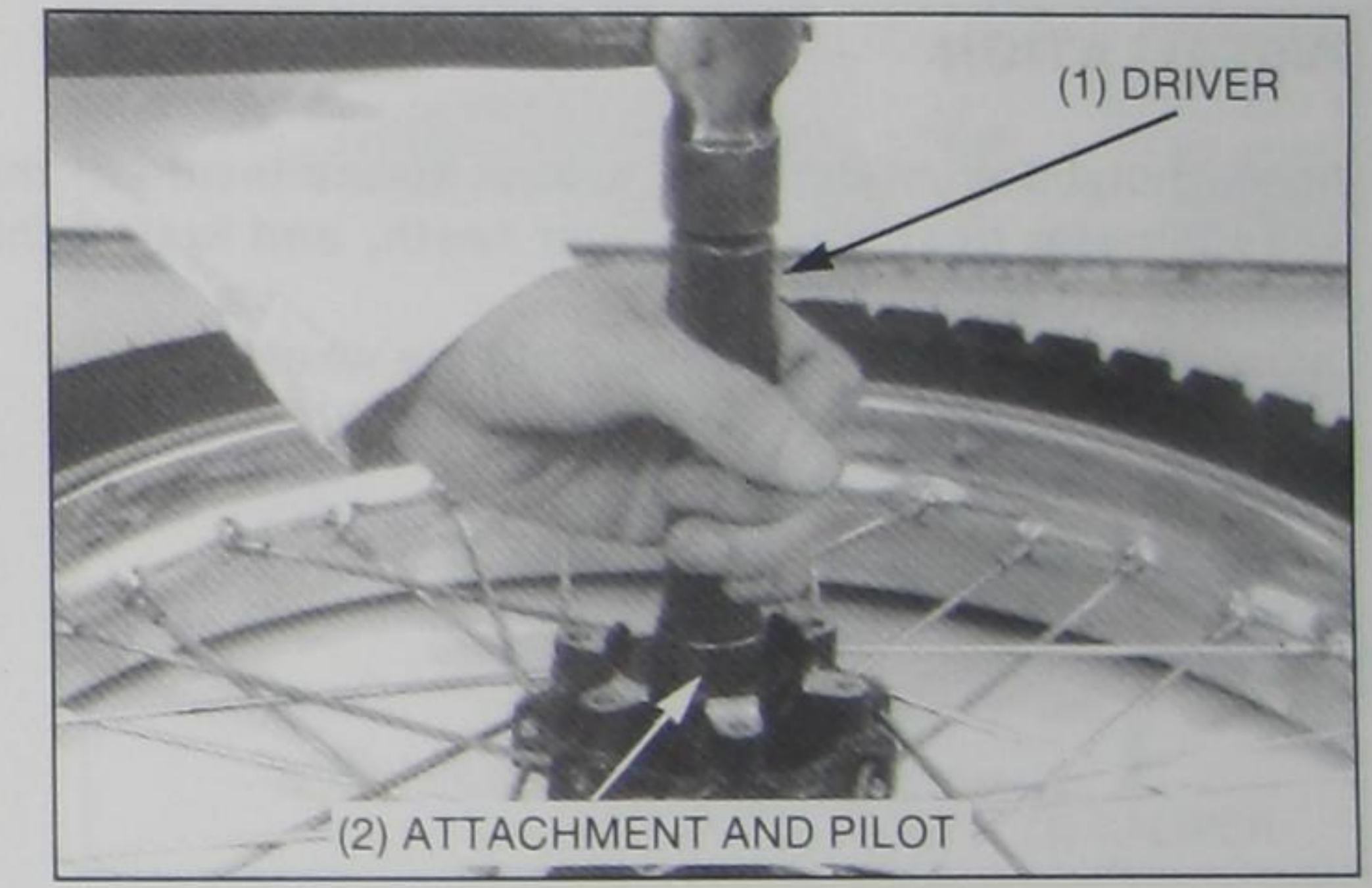
## ASSEMBLY


(2) DUST SEAL
(1) SPEEDOMETER GEAR RETAINER
(3) BEARING (6202)
(4) DISTANCE COLLAR
(6) DUST SEAL
(7) BRAKE DISC
(5) BEARING (6202)
(8) DISC BOLTS

Pack new bearing cavities with grease.
Drive in the right bearing squarely with the sealed side facing up until it is fully seated.
Install the distance collar.
Drive in the left bearing squarely with the sealed side facing up until it is fully seated.

**TOOLS:**

| | |
|---|---|
| **Driver** | **07749-0010000** |
| **Attachment, 32 x 35 mm** | **07746-0010100** |
| **Pilot, 15 mm** | **07746-0040300** |


(1) DRIVER
(2) ATTACHMENT AND PILOT

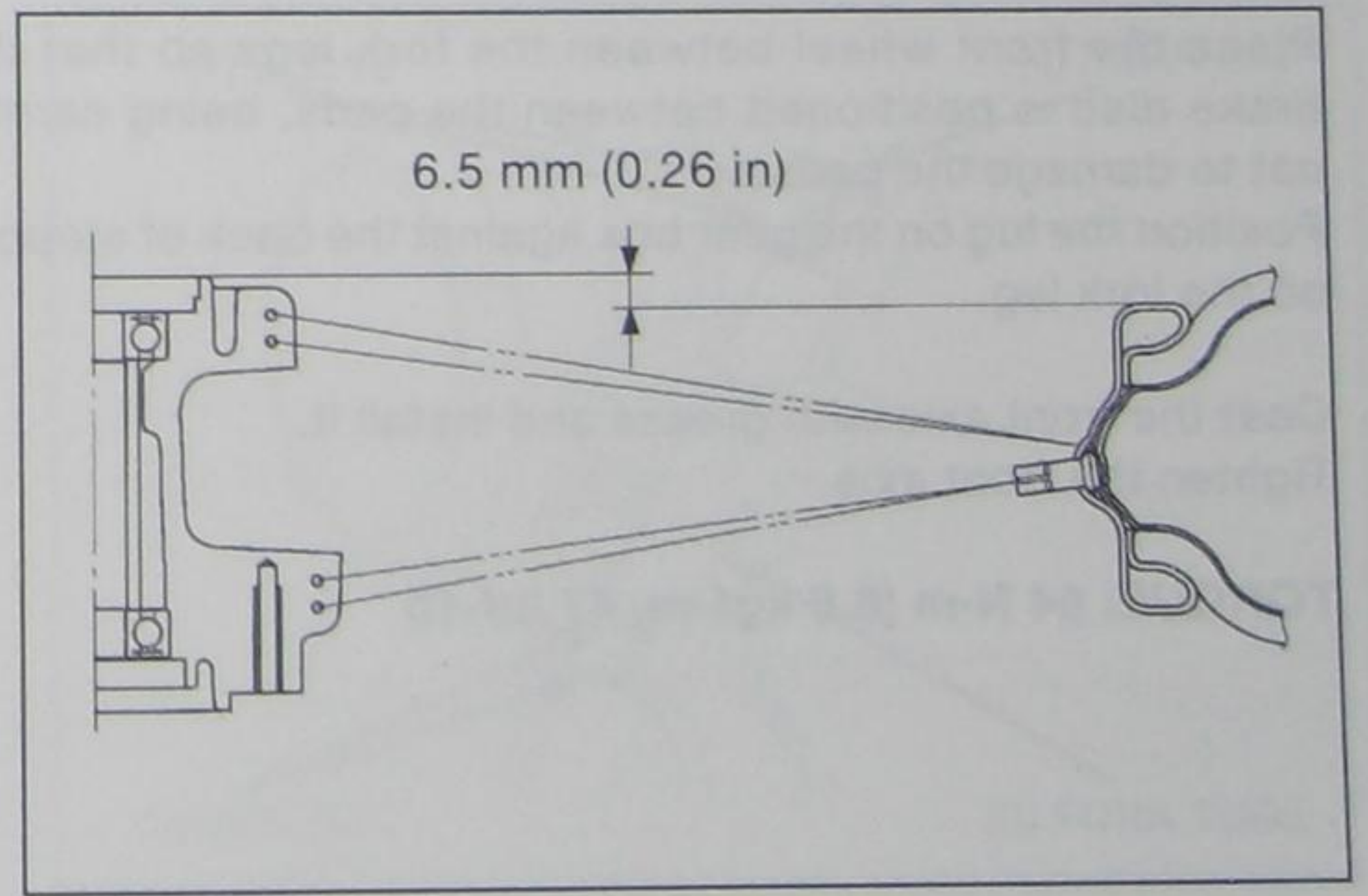
When new spokes are installed, perform as follows:
Place the rim on the work bench.
Place the hub with the left side down and begin lacing with new spokes.
Adjust the hub position so that the distance from the hub right end surface to the rim right side is 6.5 mm (0.26 in) as shown. Tighten the spokes in 2 or 3 progressive steps.

**TOOL:**

| | |
|---|---|
| **Spoke wrench, 5.8 x 6.1 mm** | **07701-0020300** |

**TORQUE:4 N·m (0.4 kgf-m, 2.9 lbf-ft)**

Check the rim runout (page 12-3).



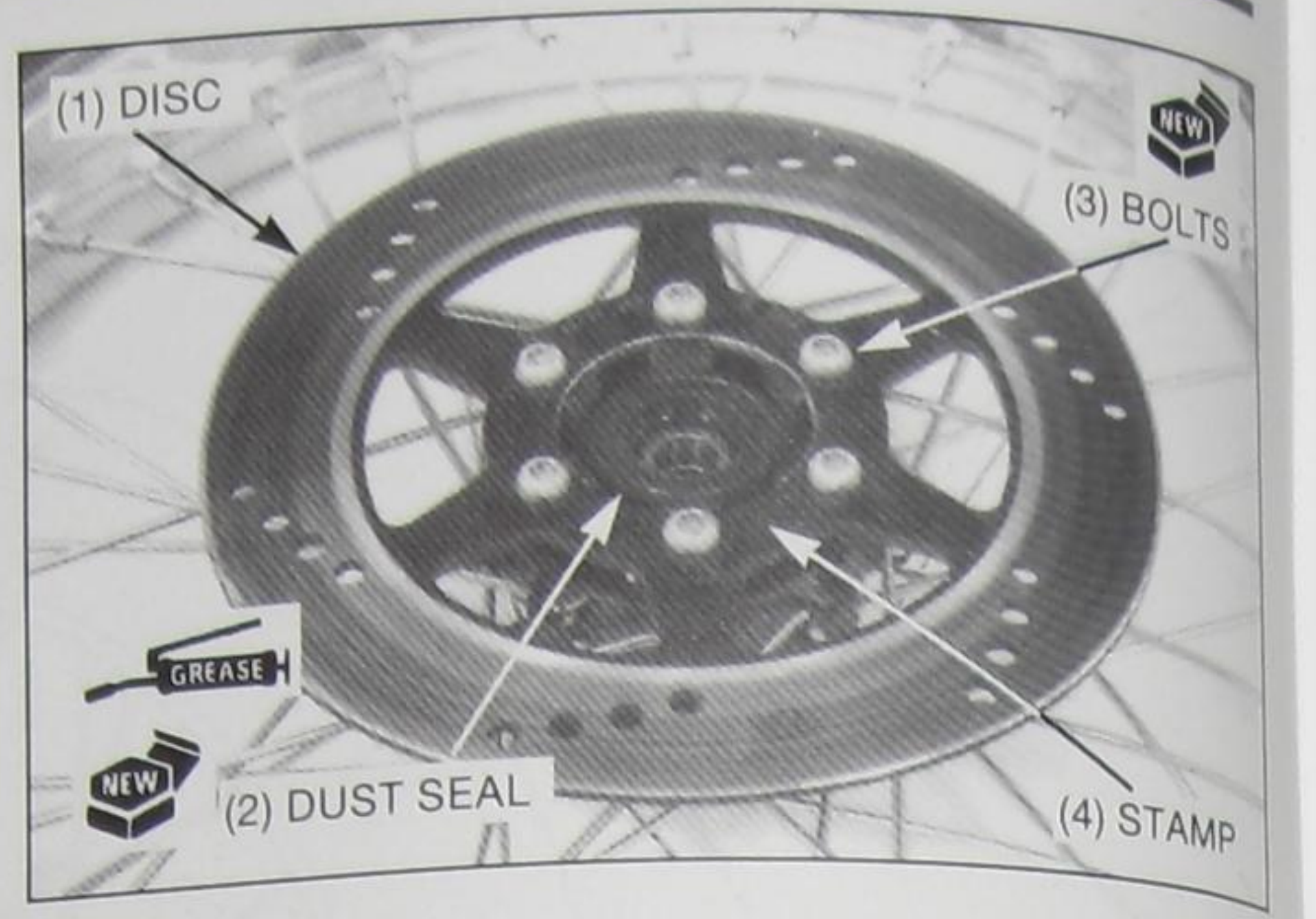
Apply grease to a new dust seal lip and install it into the wheel hub.

**⚠ WARNING**

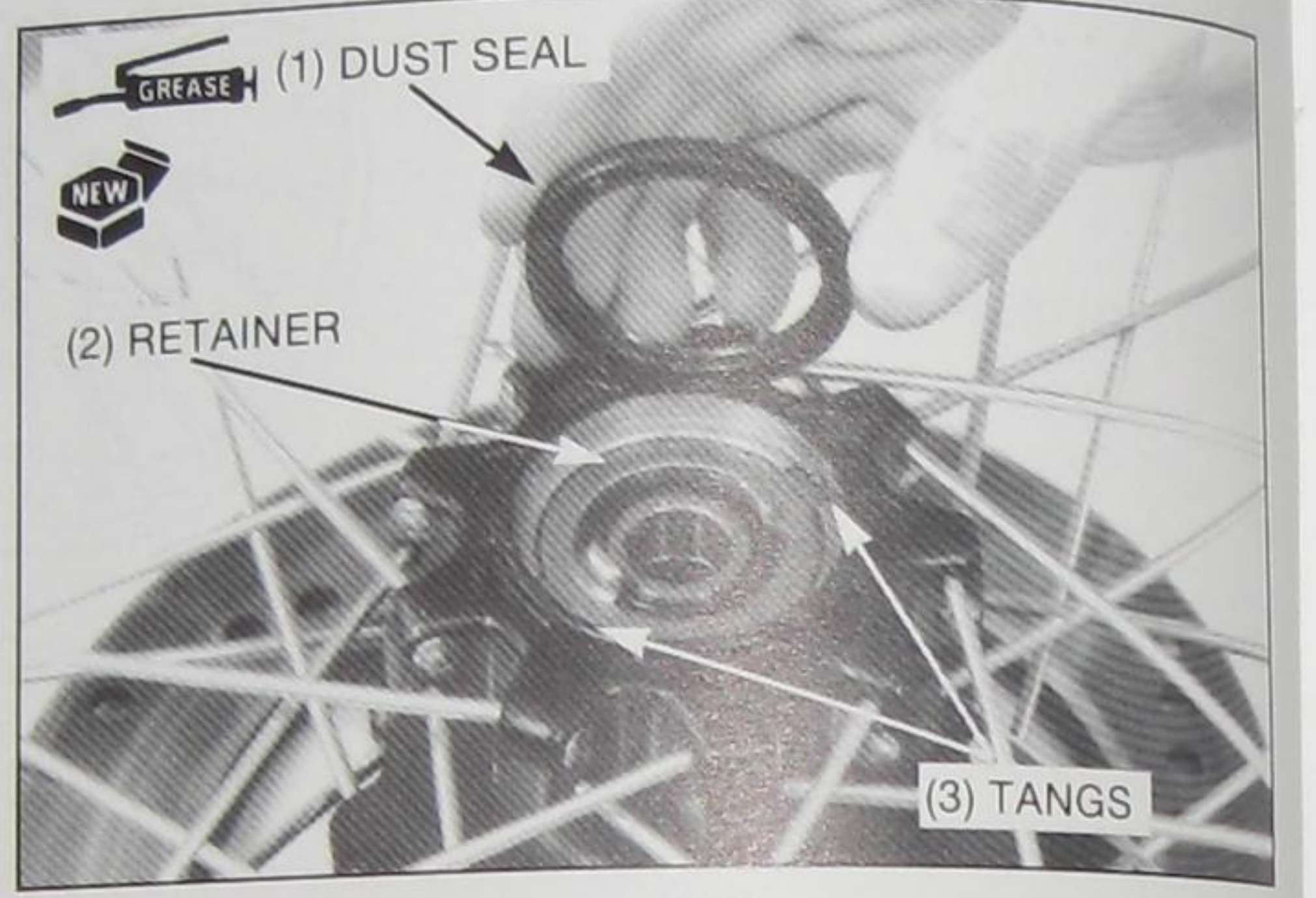
- **Do not get grease on the brake disc or stopping power will be reduced.**

Install the brake disc with the stamp facing up.
Install new disc bolts and tighten them in a crisscross pattern in 2 or 3 steps.

**TORQUE: 20 N·m (2.0 kgf-m, 14 lbf-ft)**


(1) DISC
NEW
(3) BOLTS
GREASE
NEW
(2) DUST SEAL
(4) STAMP

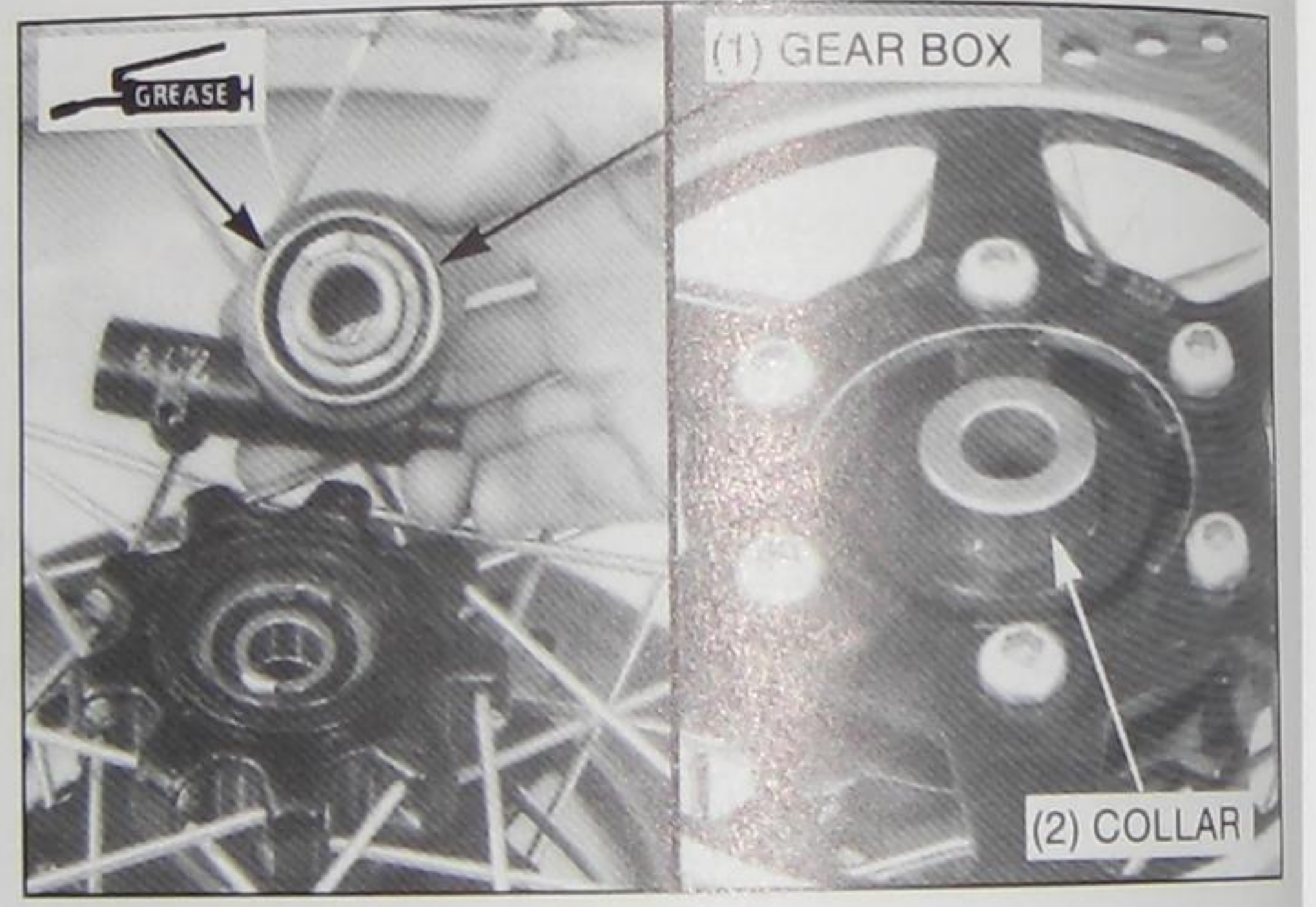
Install the speedometer gear retainer into the wheel hub, aligning the tangs with the slots in the hub.
Apply grease to a new dust seal lip and install it.


GREASE
(1) DUST SEAL
NEW
(2) RETAINER
(3) TANGS

**INSTALLATION**

Apply molybdenum disulfide grease to the inside of the speedometer gear box and gear teeth, and install the washers and speedometer gear.
Install the speedometer gear box into the wheel hub.

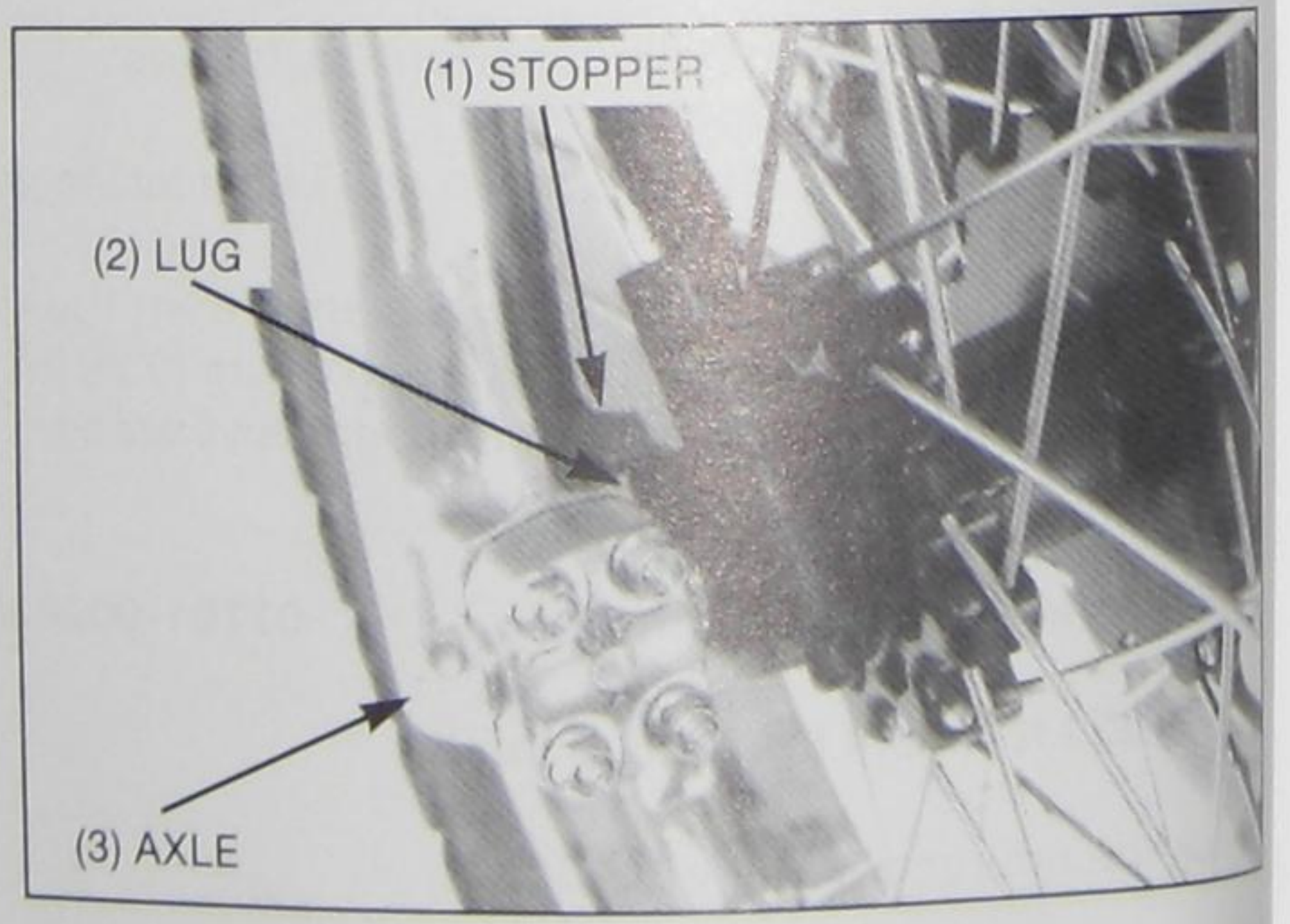
Install the side collar.


GREASE
(1) GEAR BOX
(2) COLLAR

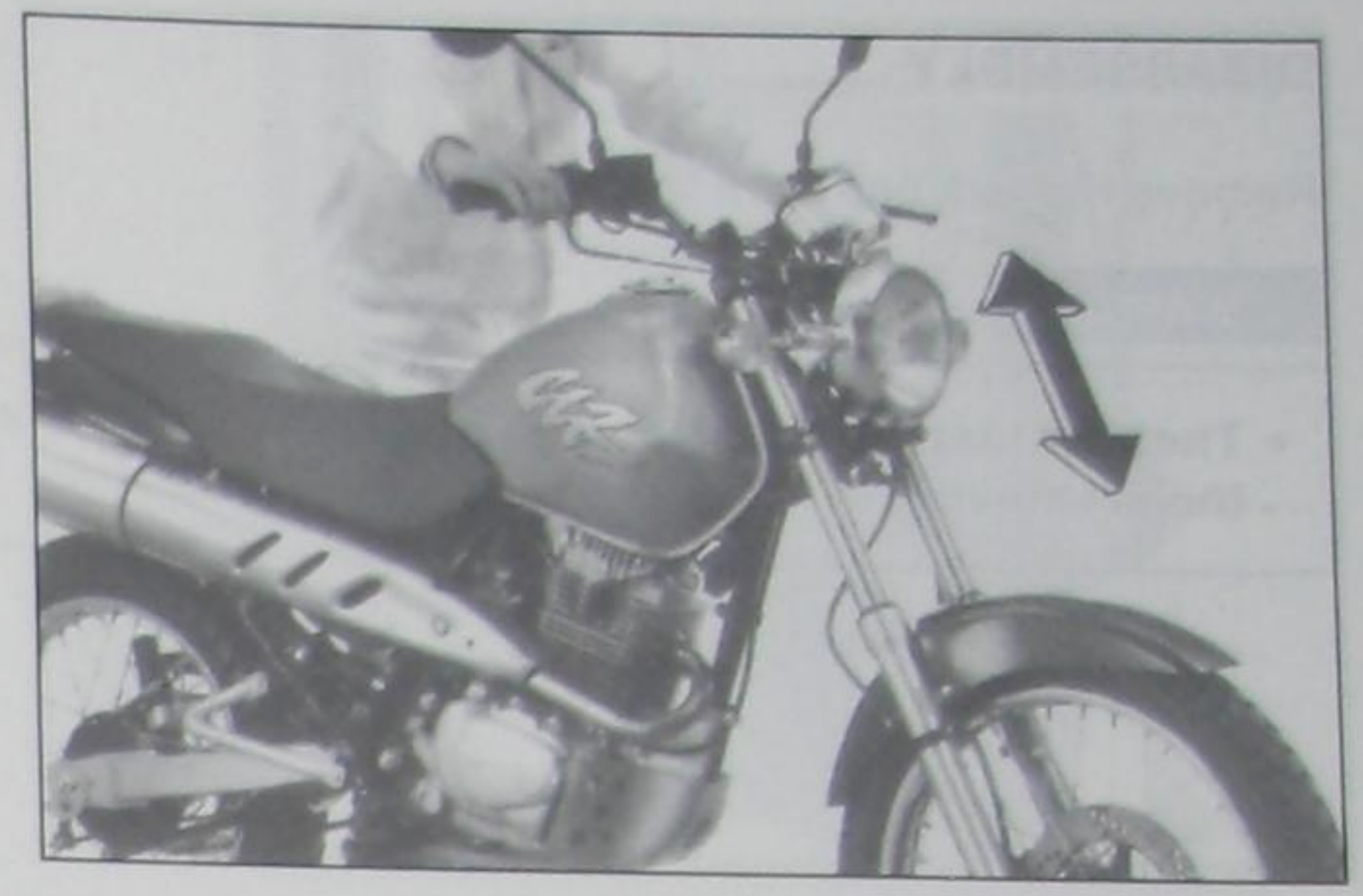
Place the front wheel between the fork legs so that the brake disc is positioned between the pads, being careful not to damage the pads.
Position the lug on the gear box against the back of stopper on the fork leg.

Coat the front axle with grease and install it.
Tighten the front axle.

**TORQUE: 64 N·m (6.5 kgf-m, 47 lbf-ft)**


(1) STOPPER
(2) LUG
(3) AXLE

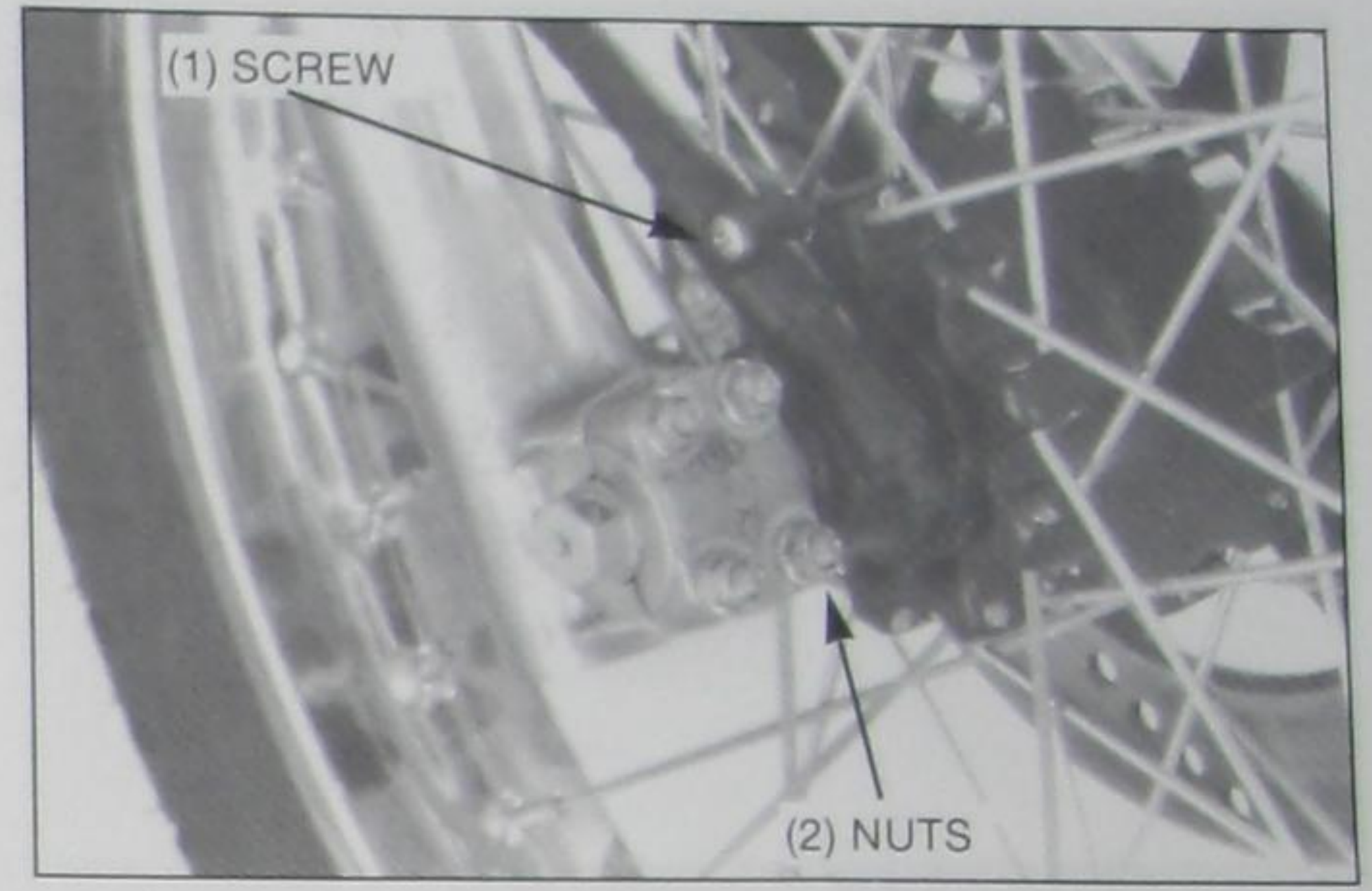
With the front brake applied, pump the forks up and down several times to seat the axle and check brake operation.



While keeping the fork parallel, tighten the upper holder nuts first, then tighten the lower nuts.

**TORQUE: 12 N·m (1.2 kgf-m, 9 lbf-ft)**

Connect the speedometer cable to the gear box and secure it with the set screw.


(1) SCREW
(2) NUTS

## Fork

**REMOVAL**

Remove the front wheel (page 12-3).

Remove the four bolts with the brake hose clamp and the front fender from the fork legs.

Remove the screw, nut and speedometer clamp.

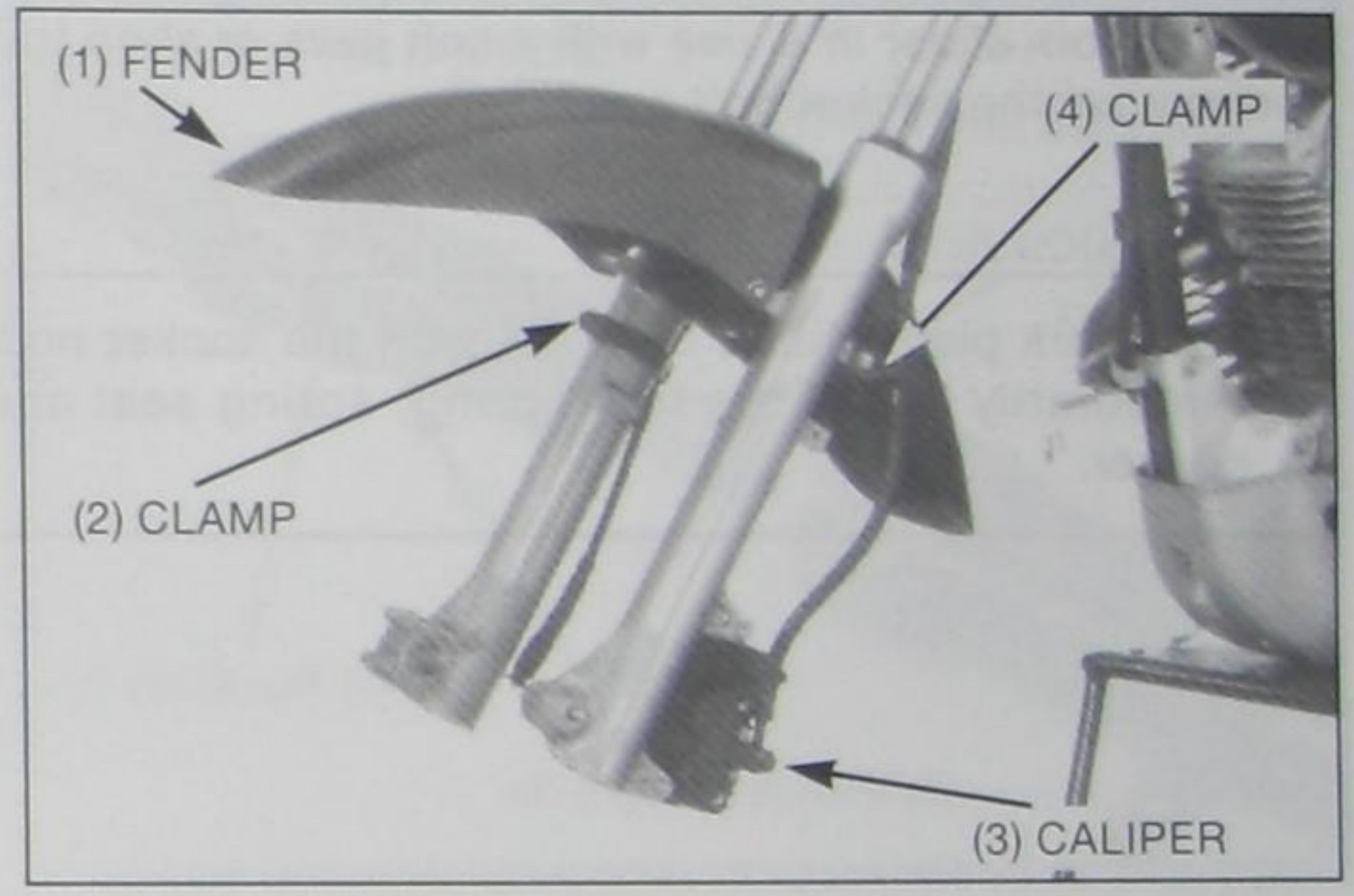
Remove the two mounting bolts and the brake caliper.

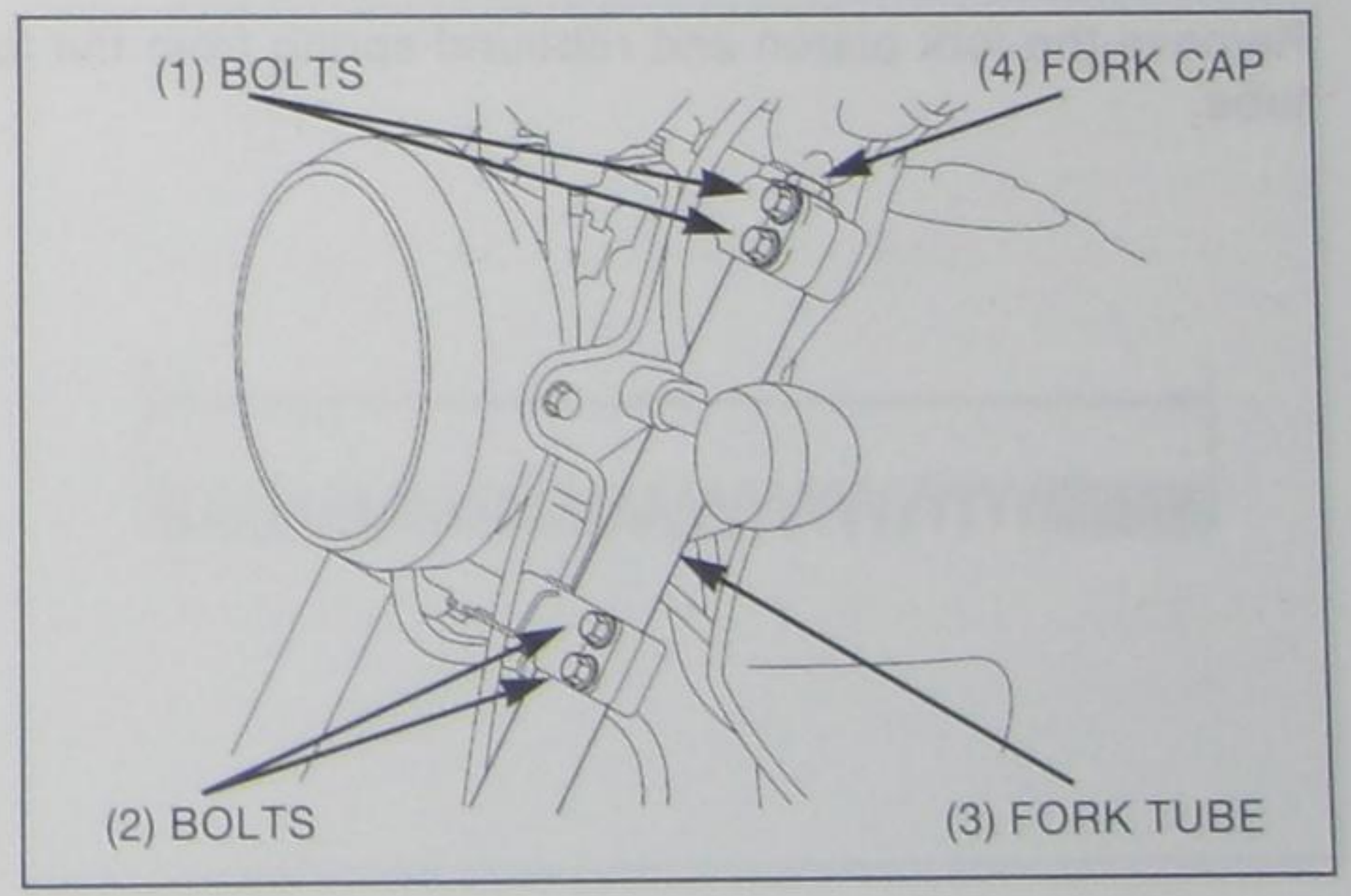
**CAUTION**

- **Support the brake caliper so that it does not hang from the brake hose. Do not twist the brake hose.**

When the fork is ready to be disassembled, loosen the fork cap, but do not remove it.

Loosen the fork top and bottom pinch bolts, and remove the fork tube from the fork bridges.


(1) FENDER
(4) CLAMP
(2) CLAMP
(3) CALIPER

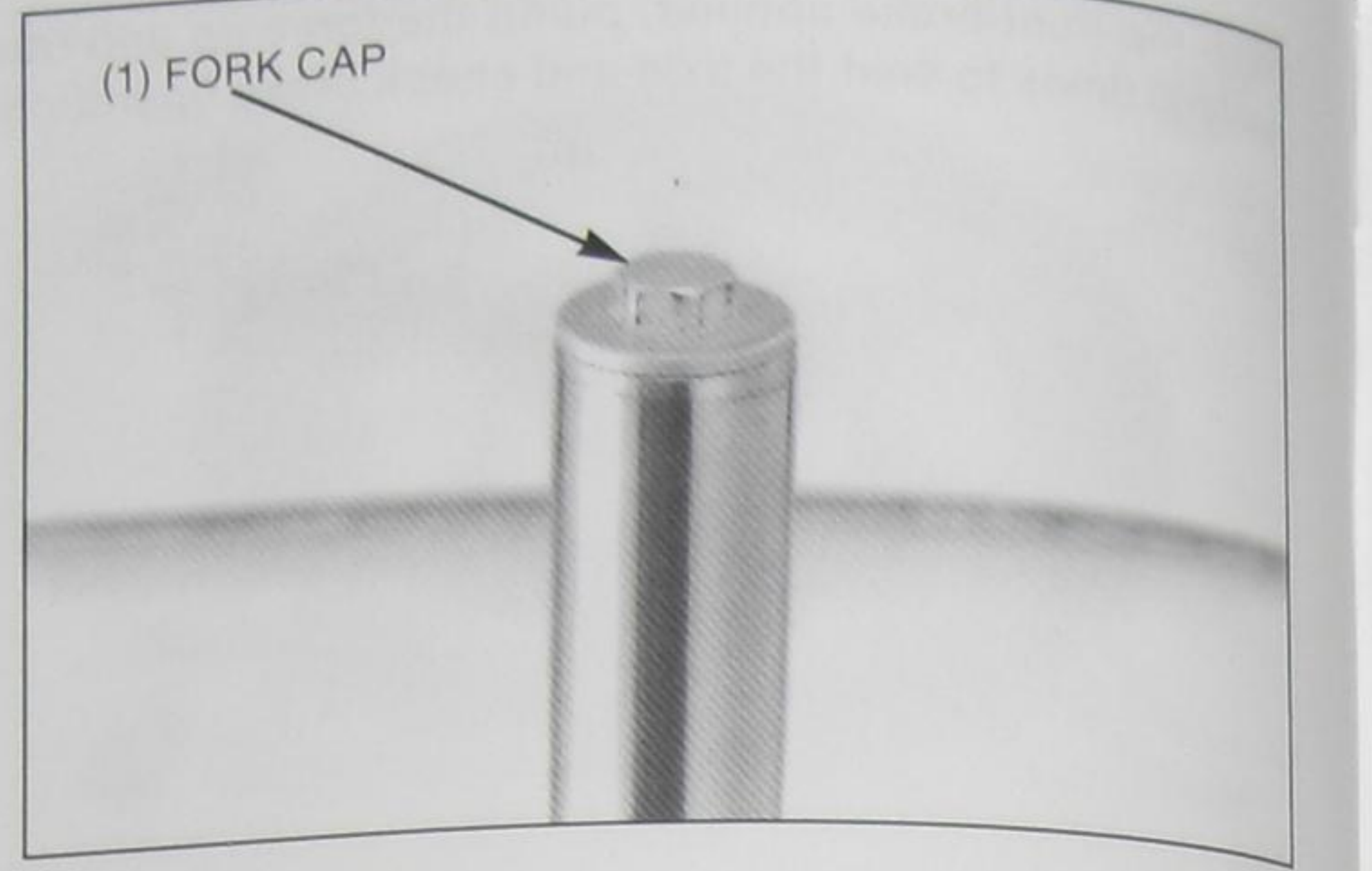

(1) BOLTS
(4) FORK CAP
(2) BOLTS
(3) FORK TUBE

### DISASSEMBLY

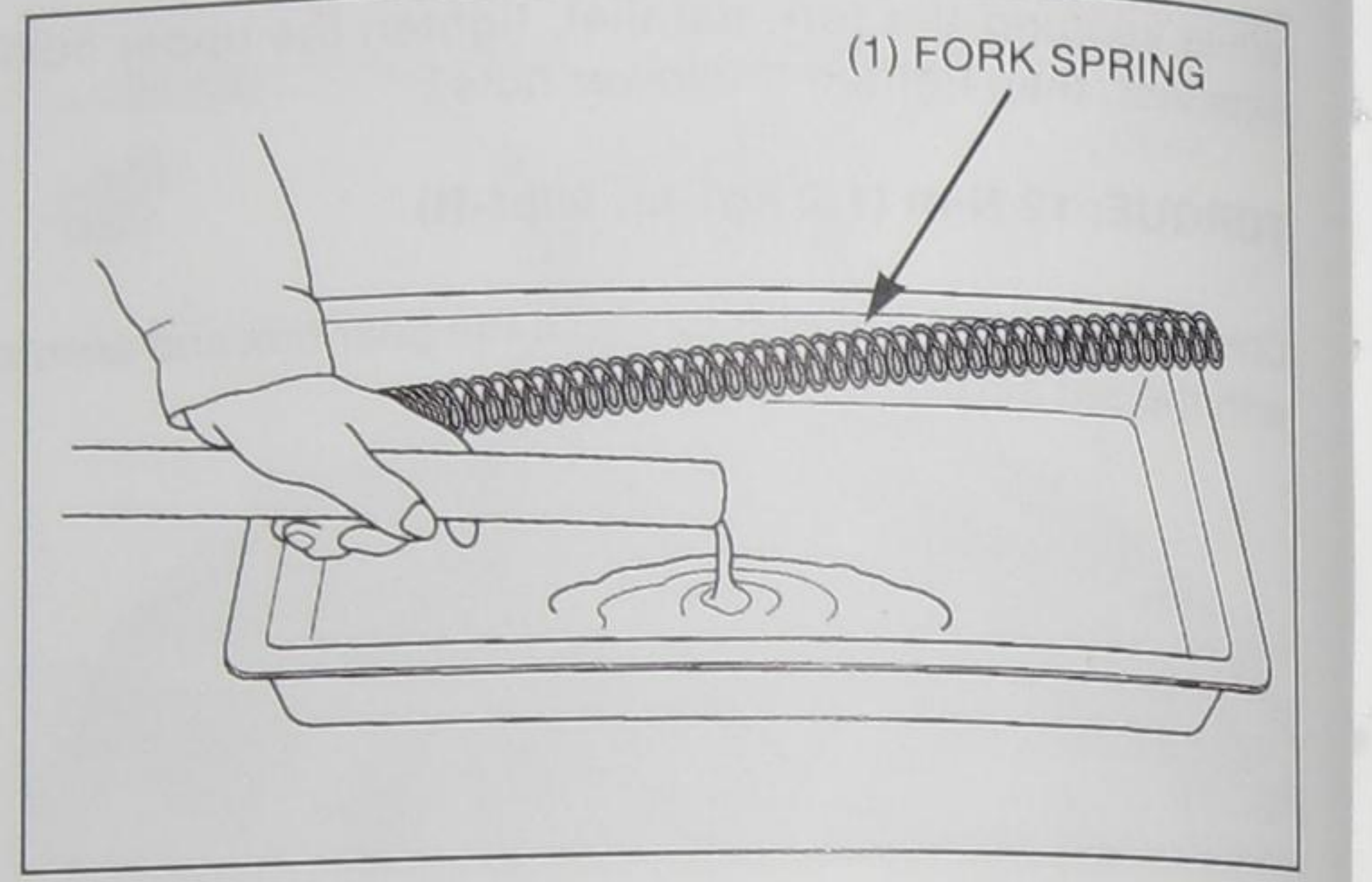
Remove the fork cap from the fork tube.

**⚠ WARNING**

- **The fork cap is under spring pressure. Use care then removing it.**



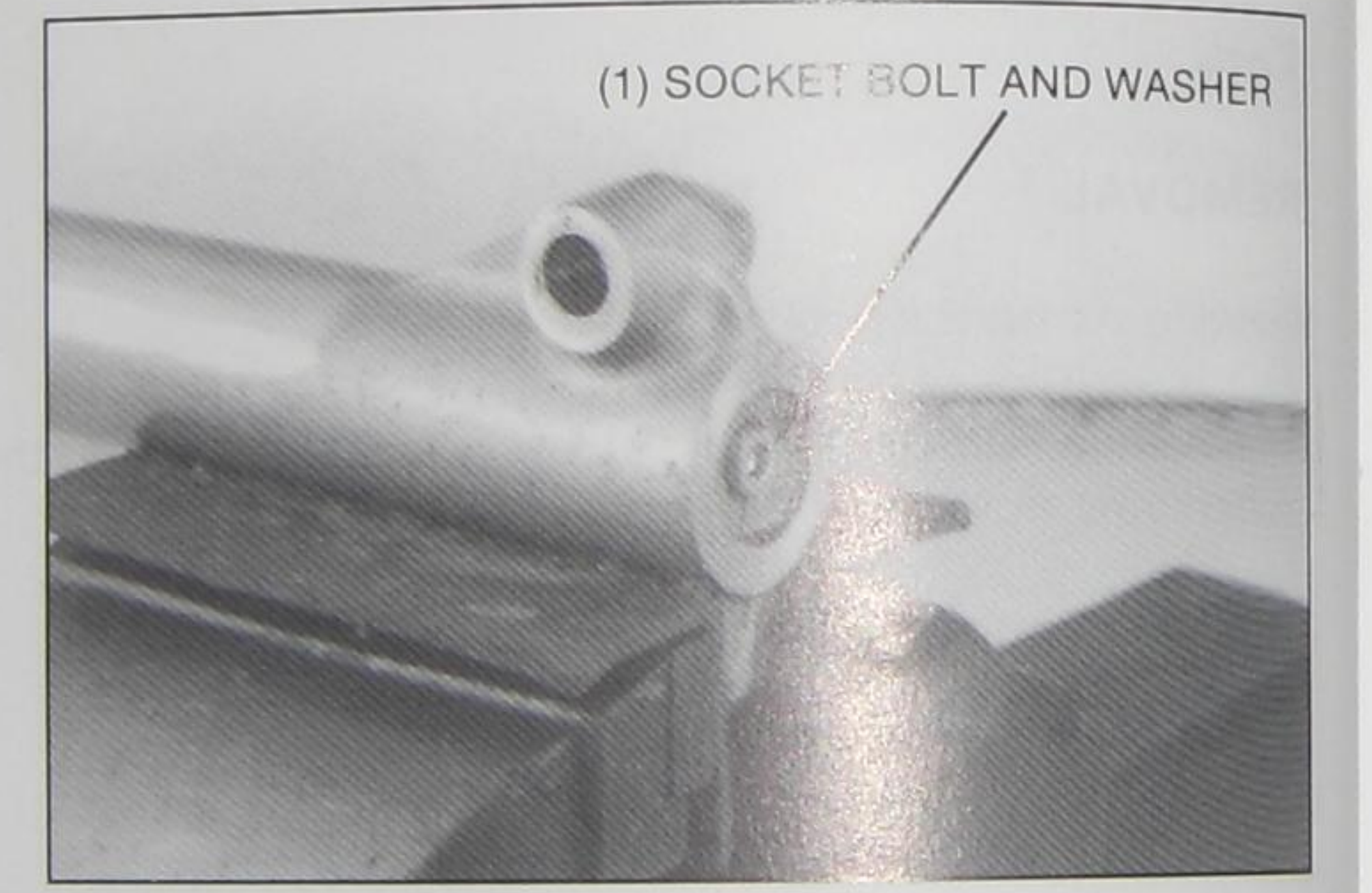
Remove the fork spring.
Pour out the fork fluid by pumping the fork tube several times.


(1) FORK SPRING

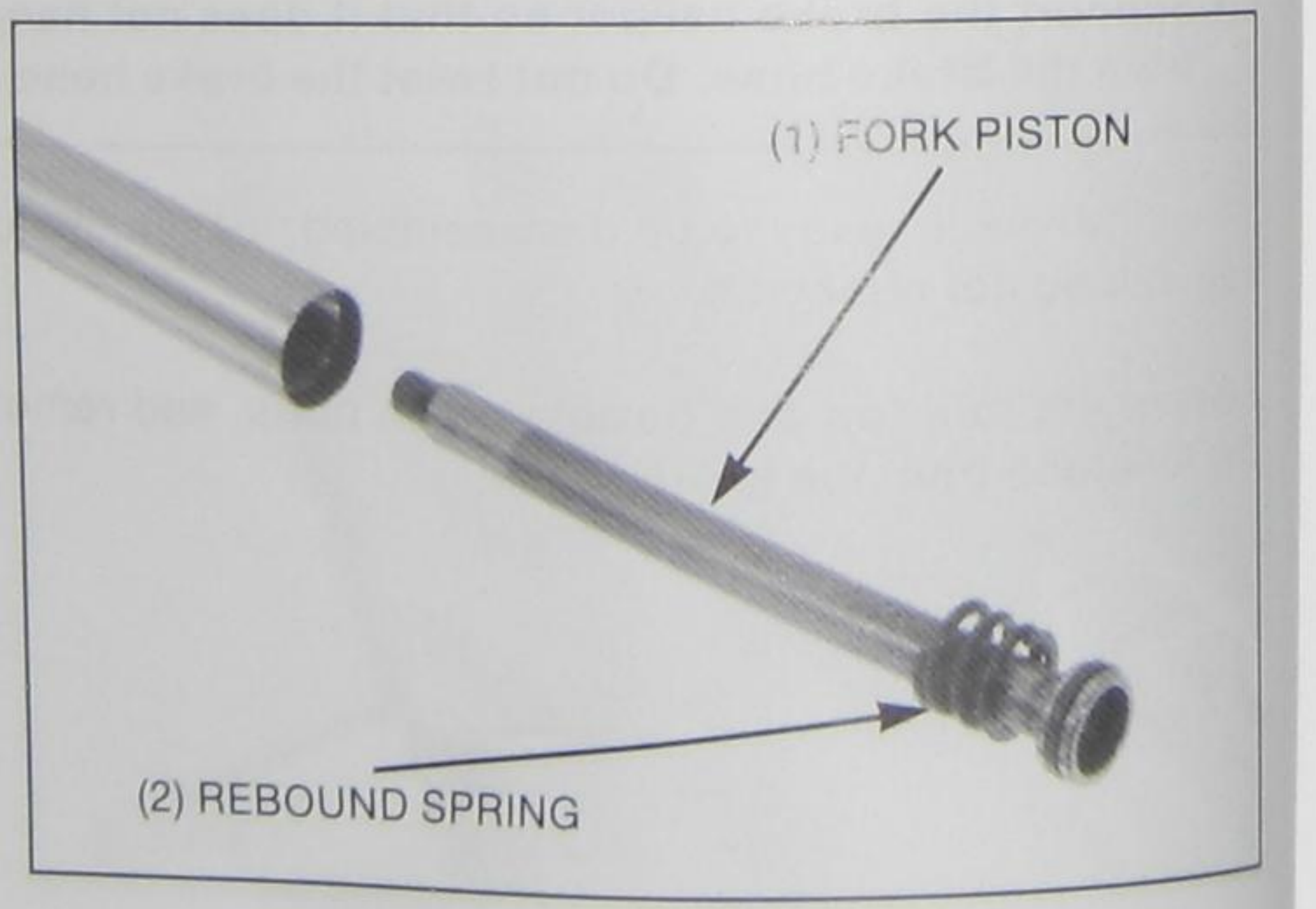
Hold the fork slider in a vise with a soft jaws or shop towel and remove the socket bolt and washer.

NOTE:

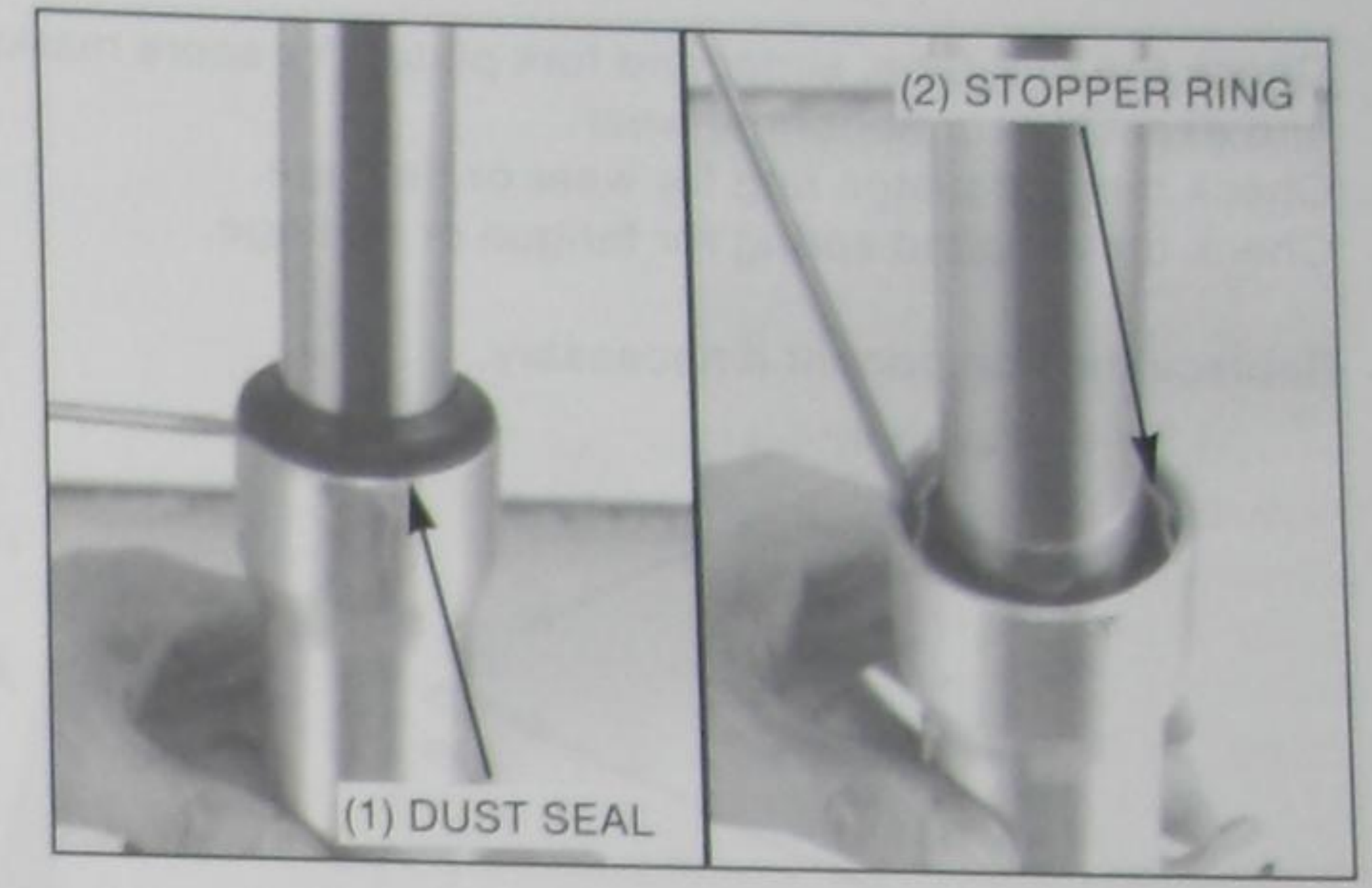
- If the fork piston turns together with the socket bolt, temporarily install the fork spring, spring seat and spacer.


(1) SOCKET BOLT AND WASHER

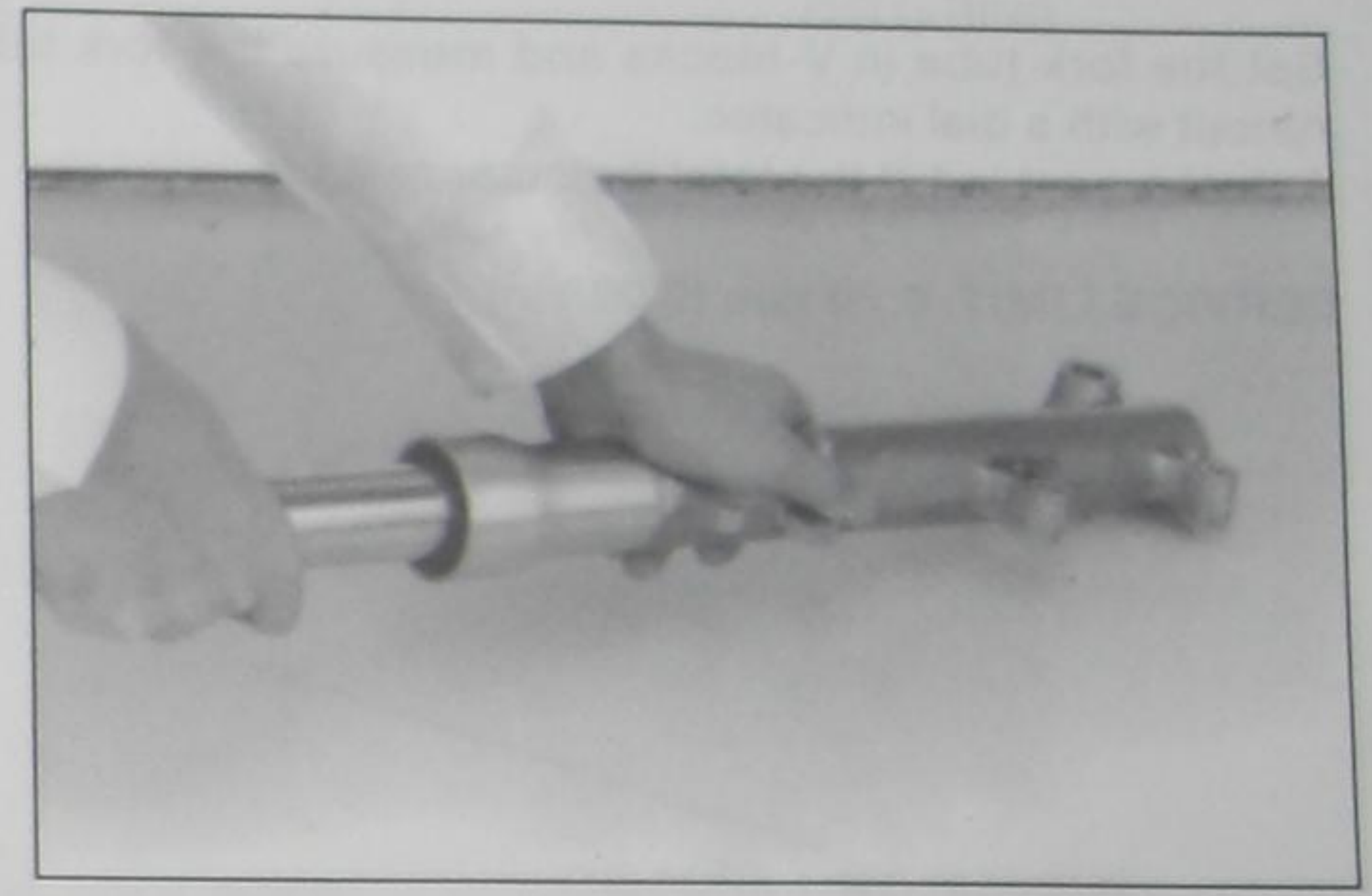
Remove the fork piston and rebound spring from the fork tube.


(1) FORK PISTON
(2) REBOUND SPRING

Remove the dust seal and the stopper ring, being careful not to scratch the fork tube sliding surface.


(1) DUST SEAL
(2) STOPPER RING

Using quick successive motions, pull the fork tube out of the fork slider. The slider bushing will be forced out by the fork tube bushing.



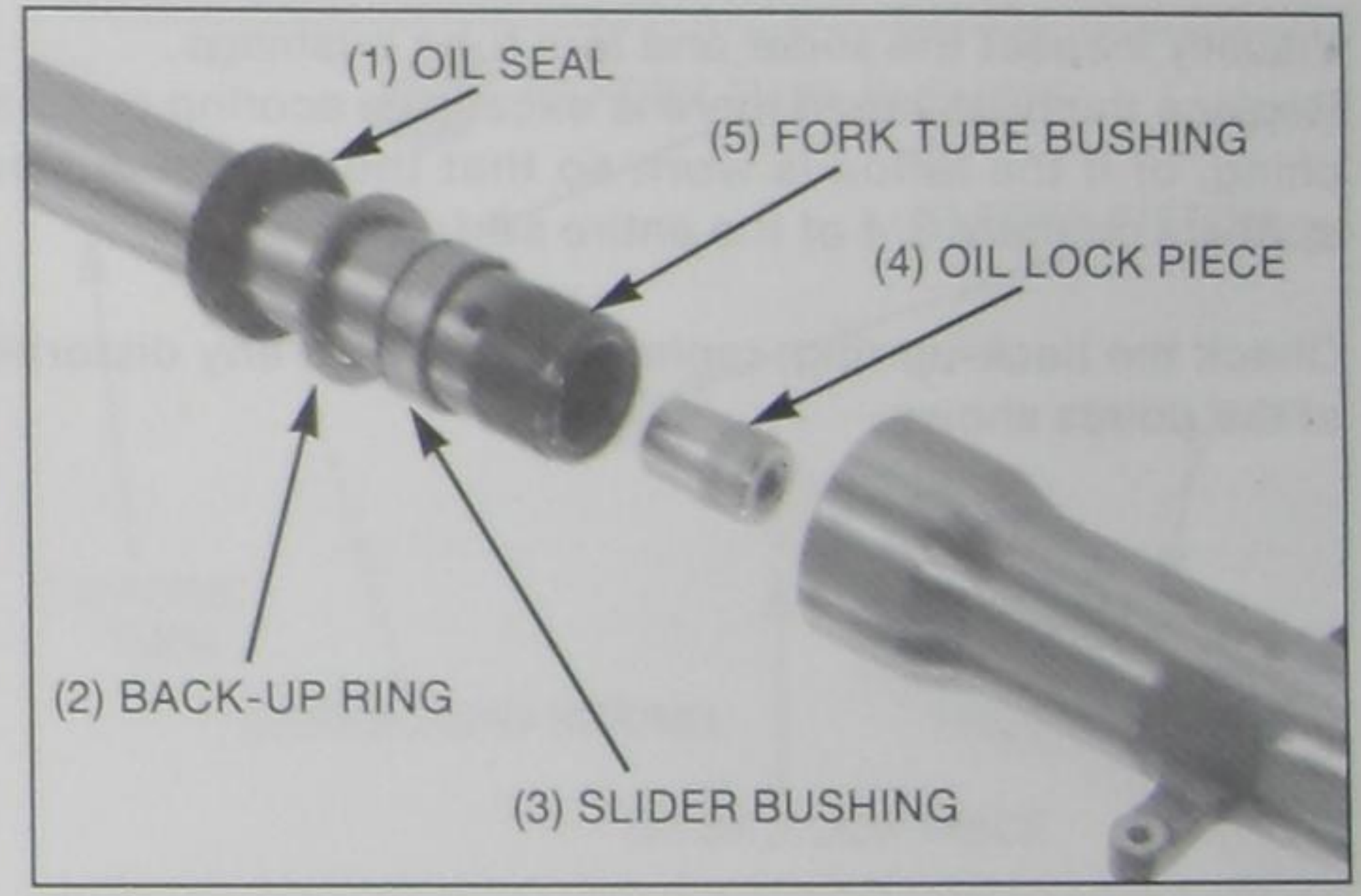
Remove the oil lock piece.

Remove the oil seal, back-up ring and the slider bushing.

NOTE:

- Do not remove fork tube bushing unless it is necessary to replace it with a new one.

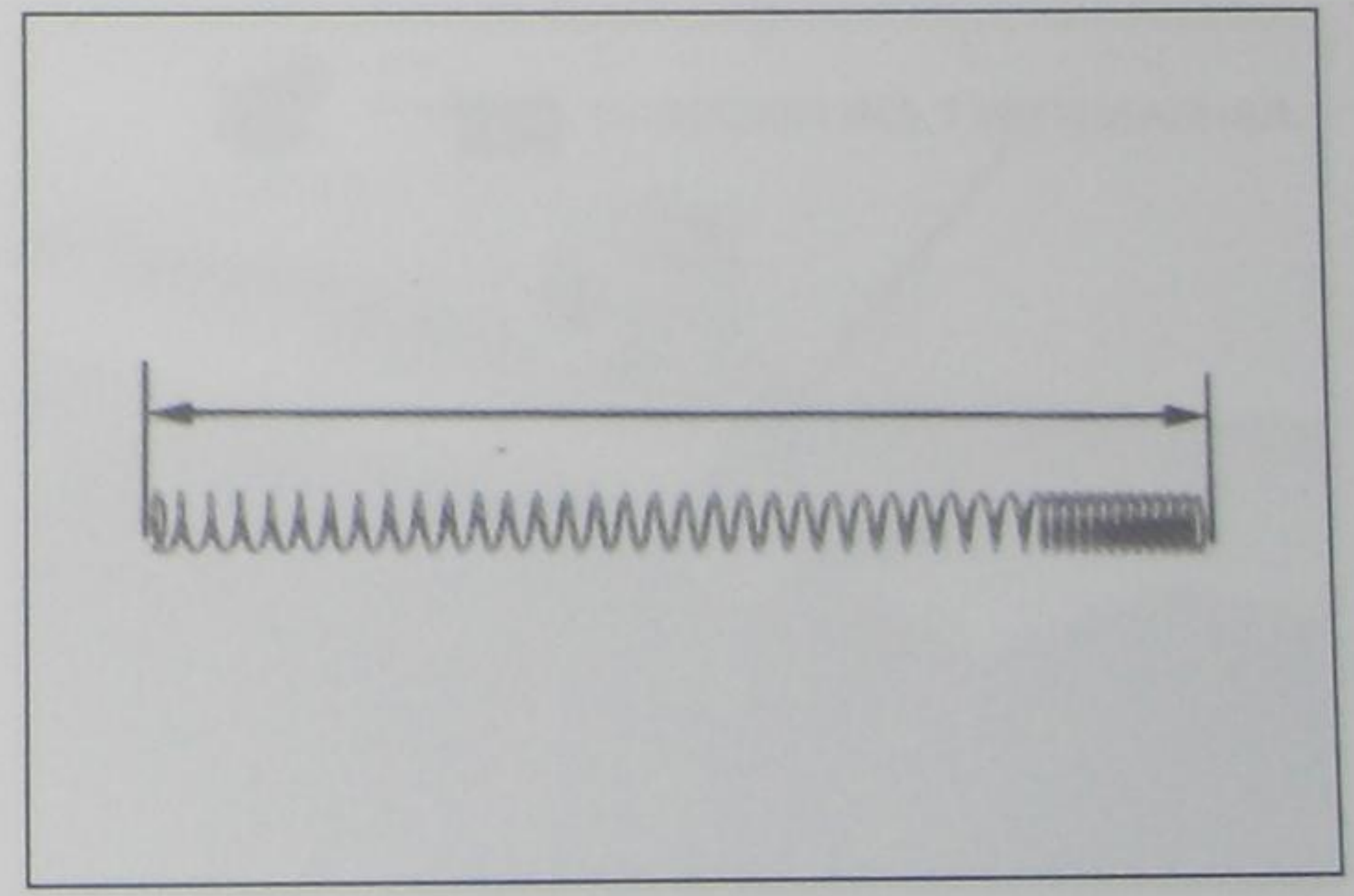
Carefully remove the fork tube bushing by prying the slot with a screwdriver until the bushing can be pulled off by hand.


(1) OIL SEAL
(5) FORK TUBE BUSHING
(4) OIL LOCK PIECE
(2) BACK-UP RING
(3) SLIDER BUSHING

### INSPECTION

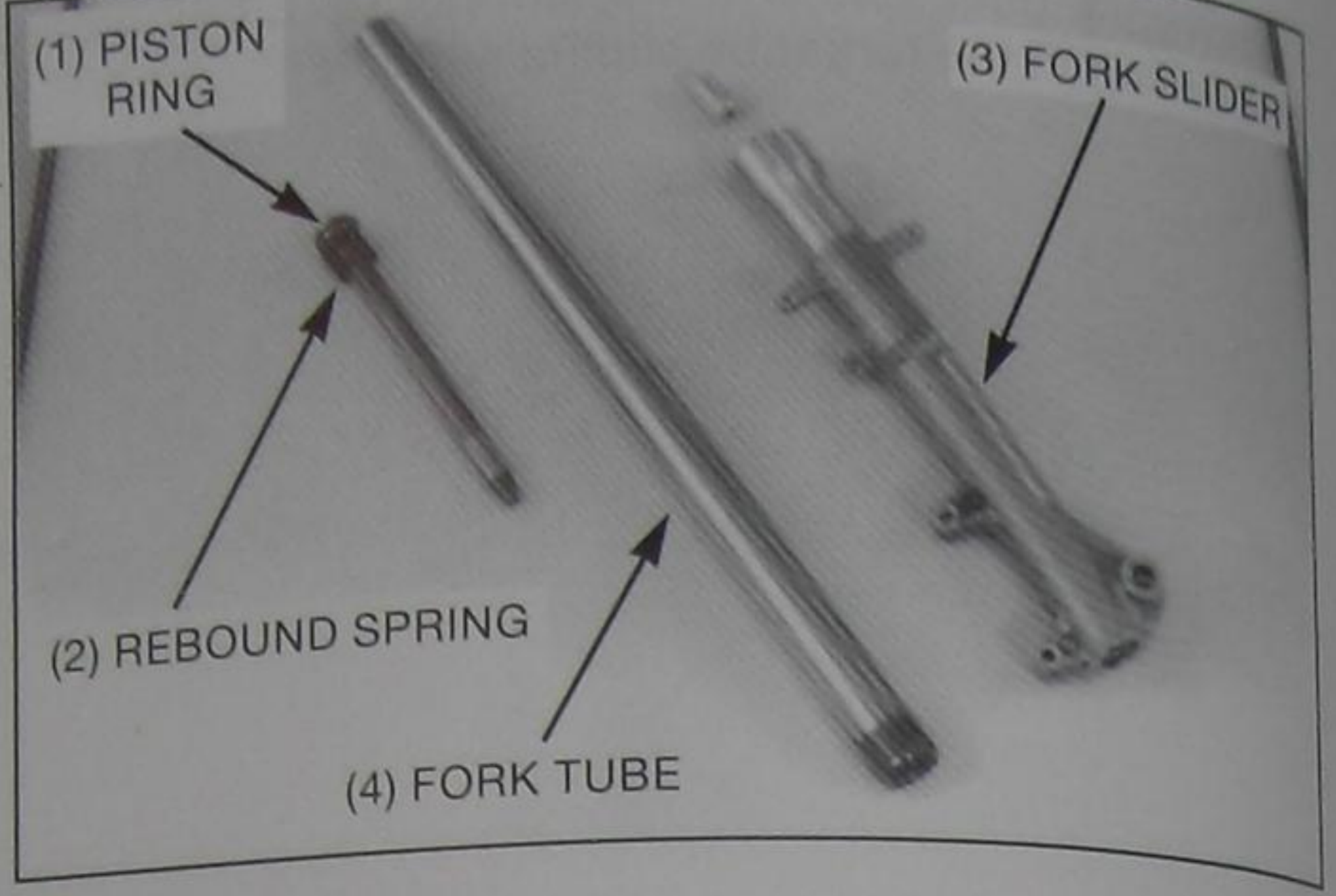
Measure the fork spring free length.

**SERVICE LIMIT: 579.3 mm (22.81 in)**



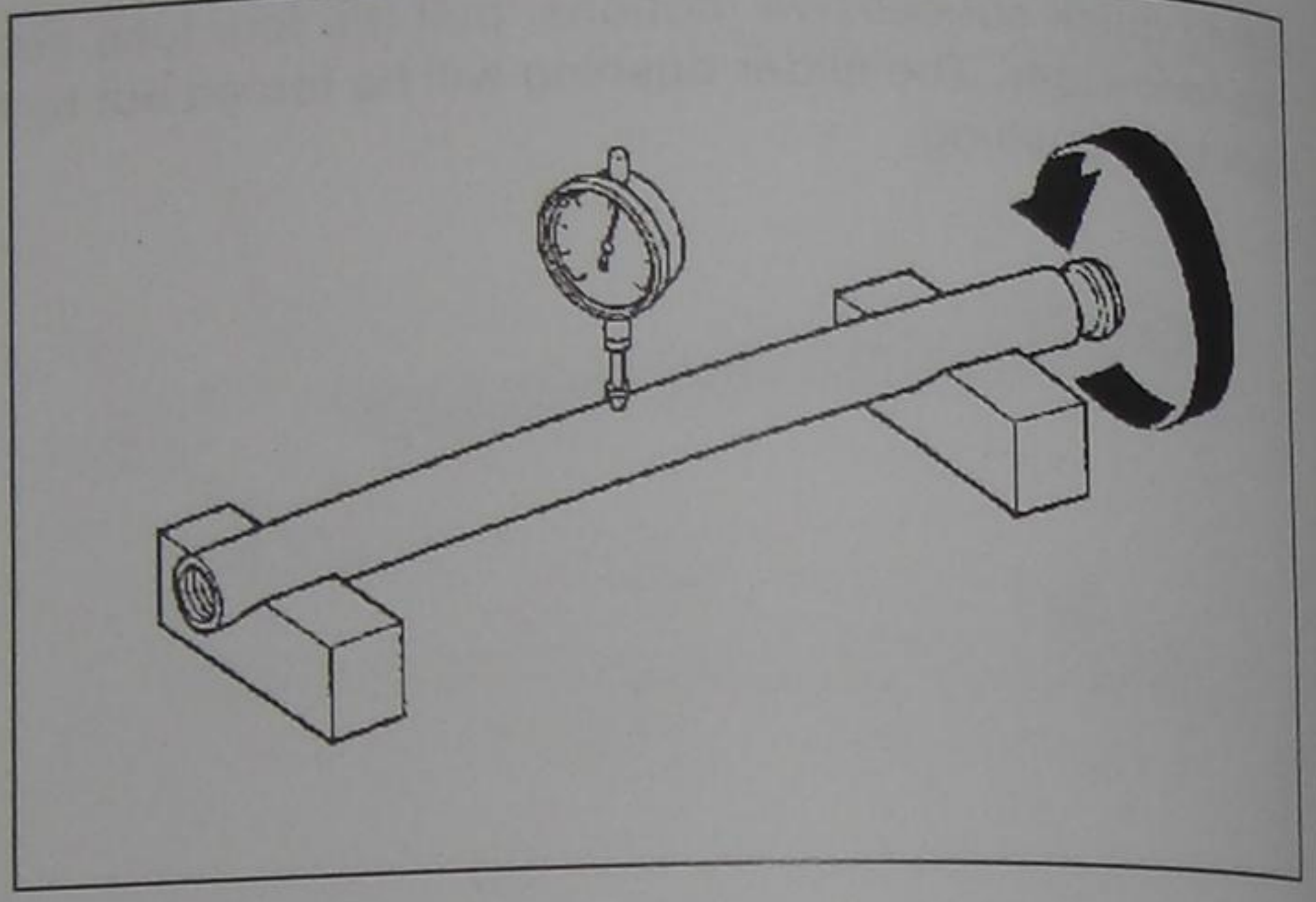
Check the fork tube, slider and fork piston for score marks, and excessive or abnormal wear.
Check the fork piston ring for wear or damage.
Check the rebound spring for fatigue or damage.

Replace the component if necessary.


(1) PISTON RING
(3) FORK SLIDER
(2) REBOUND SPRING
(4) FORK TUBE

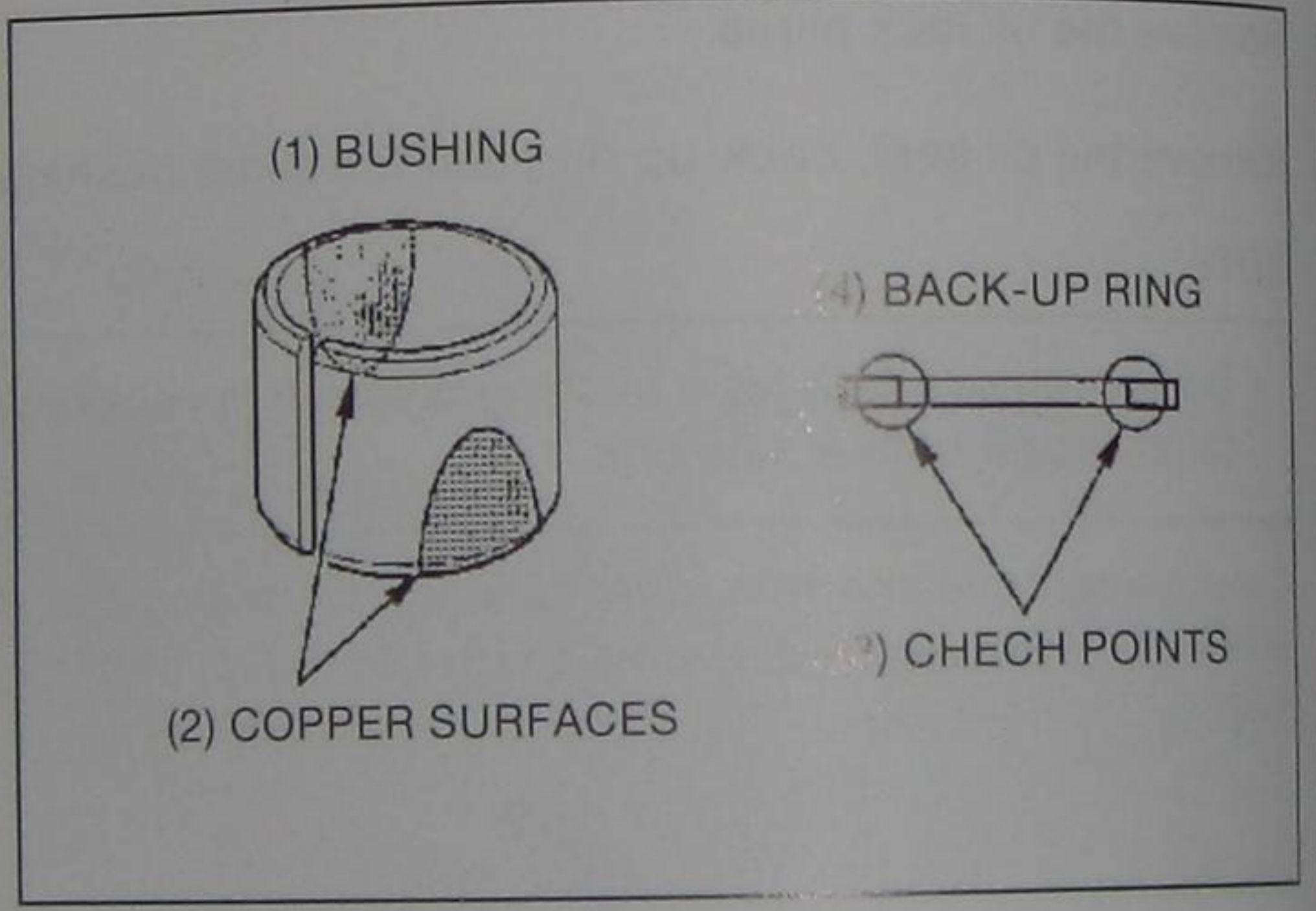
Set the fork tube in V-blocks and measure the fork tube runout with a dial indicator.
Actual runout is 1/2 the total indicator reading.

**SERVICE LIMIT: 0.20 mm (0.008 in)**



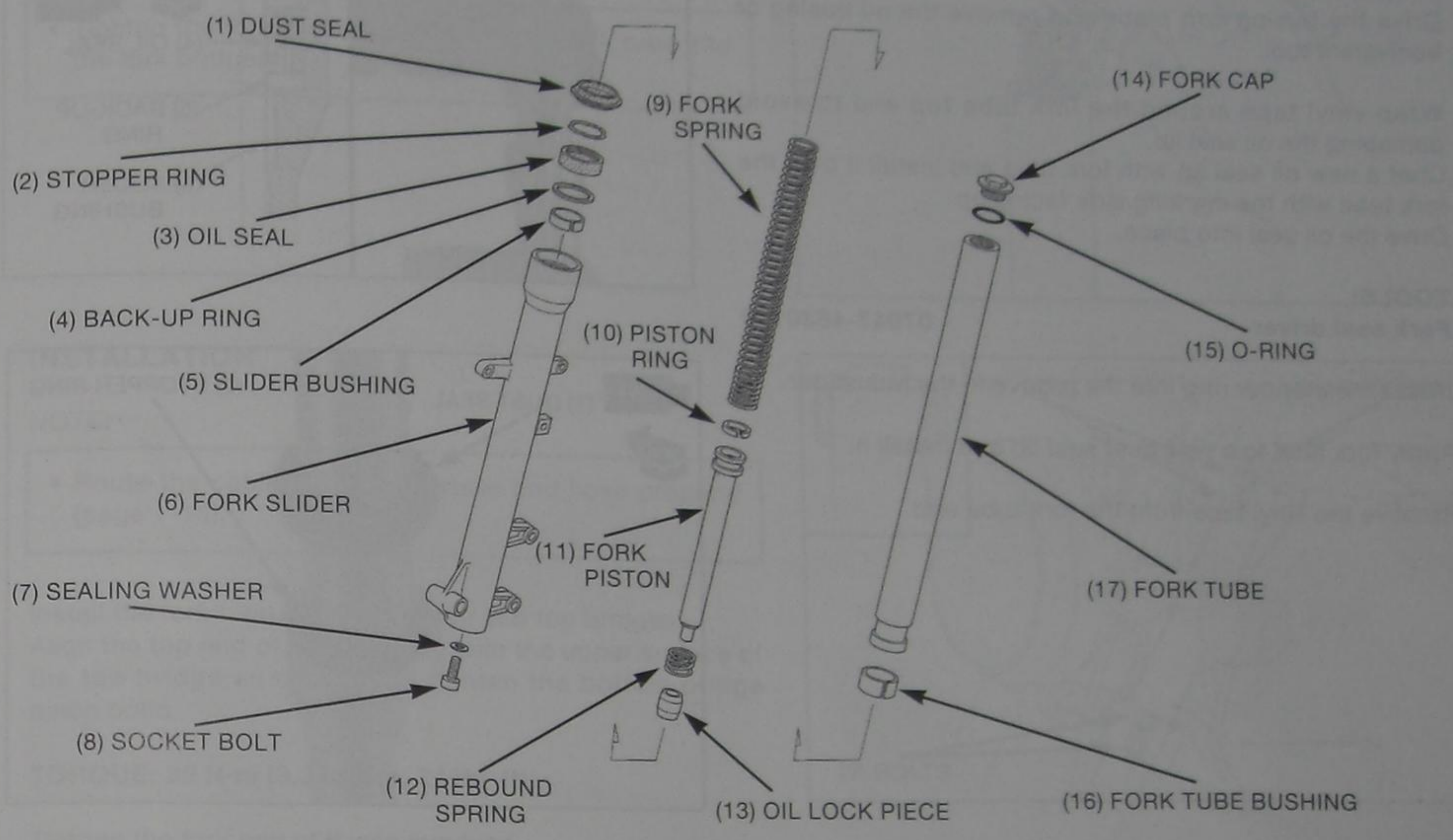
Visually inspect the slider and fork tube bushings.
Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.


(1) BUSHING
(4) BACK-UP RING
(2) COPPER SURFACES
(3) CHECH POINTS

## ASSEMBLY

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.


(1) DUST SEAL
(2) STOPPER RING
(3) OIL SEAL
(4) BACK-UP RING
(5) SLIDER BUSHING
(6) FORK SLIDER
(7) SEALING WASHER
(8) SOCKET BOLT
(9) FORK SPRING
(10) PISTON RING
(11) FORK PISTON
(12) REBOUND SPRING
(13) OIL LOCK PIECE
(14) FORK CAP
(15) O-RING
(16) FORK TUBE BUSHING
(17) FORK TUBE

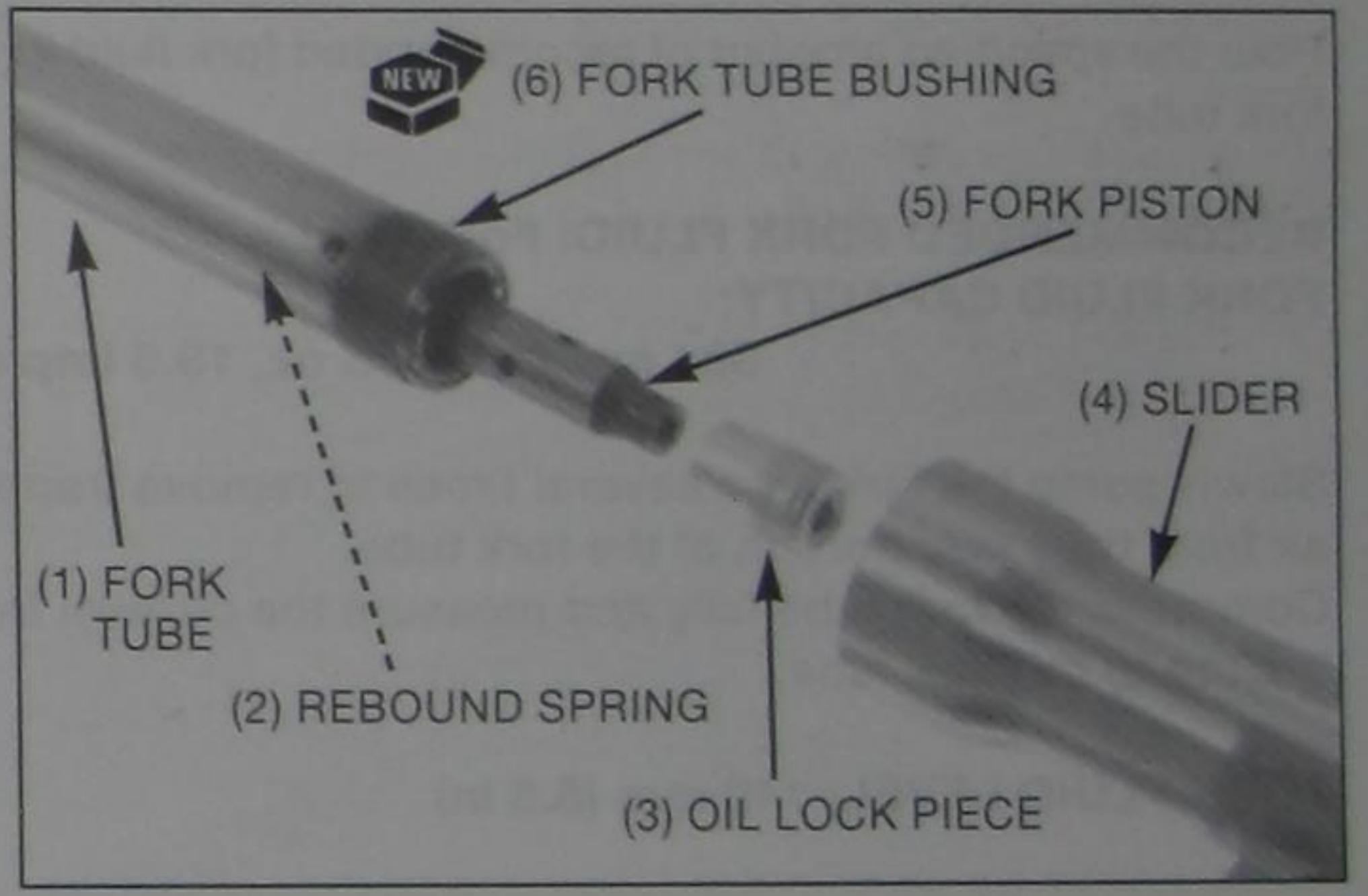
Install a new fork tube bushing if it has been removed.

**CAUTION**

- **Be careful not to damage the coating of the bushing.**
- **Do not open the bushing more than necessary.**

NOTE:

- Remove the burrs from the bushing mating surface, being careful not to peel off the coating.

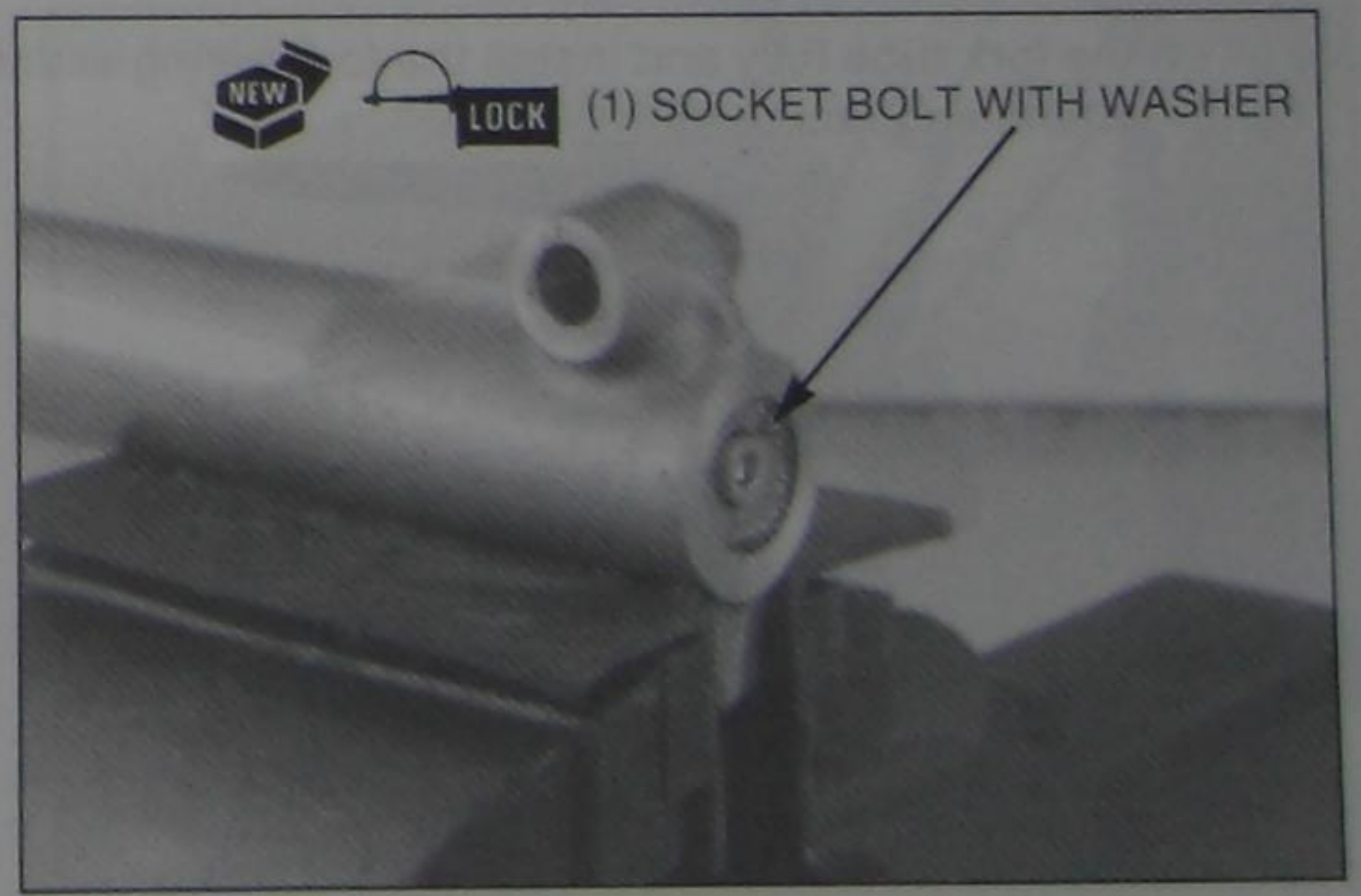

(6) FORK TUBE BUSHING
(5) FORK PISTON
(4) SLIDER
(1) FORK TUBE
(2) REBOUND SPRING
(3) OIL LOCK PIECE

Install the rebound spring onto the fork piston.
Install the fork piston into the fork tube.
Install the oil lock piece onto the fork piston end.

Install the fork tube into the fork slider.

Hold the fork slider in a vise with a soft jaws or shop towel.
Apply locking agent to the socket bolt threads.
Install the socket bolt with a new sealing washer and tighten it.

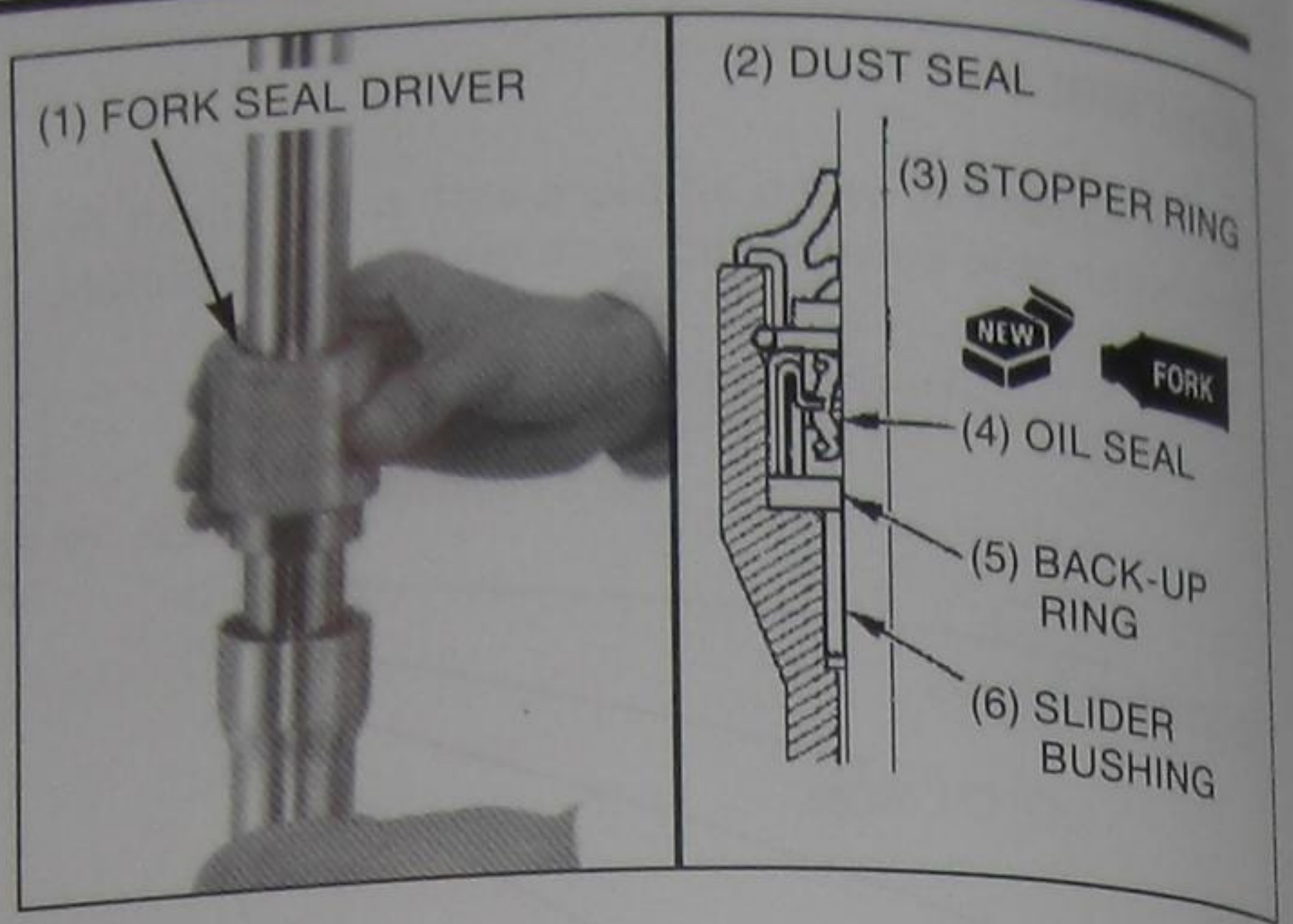
**TORQUE: 20 N·m (2.0 kgf-m, 14 lbf-ft)**


LOCK
(1) SOCKET BOLT WITH WASHER

NOTE:

- If the fork piston turns together with the socket bolt, temporarily install the fork spring, spring seat and spacer.

Place the slider bushing over the fork tube and rest it on the slider. Put the back-up ring with the chamfered side facing down and an old busing or equivalent tool on the top of the slider busing.
Drive the busing into place and remove the oil busing or equivalent tool.


(1) FORK SEAL DRIVER
(2) DUST SEAL
(3) STOPPER RING
NEW
FORK
(4) OIL SEAL
(5) BACK-UP RING
(6) SLIDER BUSHING

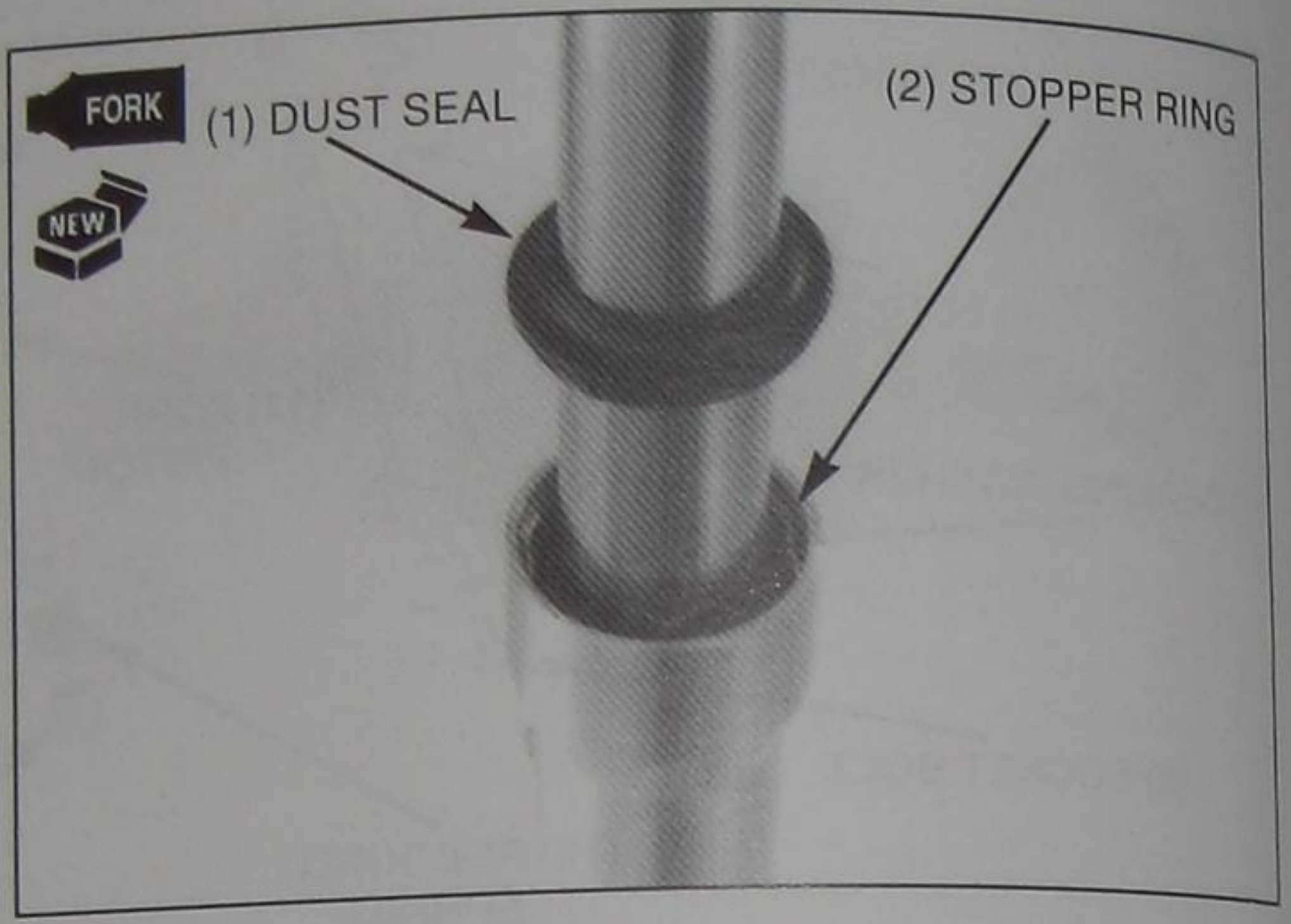
Wrap vinyl tape around the fork tube top end to avoid damaging the oil seal lip.
Coat a new oil seal lip with fork fluid and install it over the fork tube with the marking side facing up.
Drive the oil seal into place.

| **TOOLS:** | |
|---|---|
| **Fork seal driver** | **07947-4630100** |

Install the stopper ring into the groove in the fork slider.

Apply fork fluid to a new dust seal lip and install it.

Remove the vinyl tape from the fork tube end.

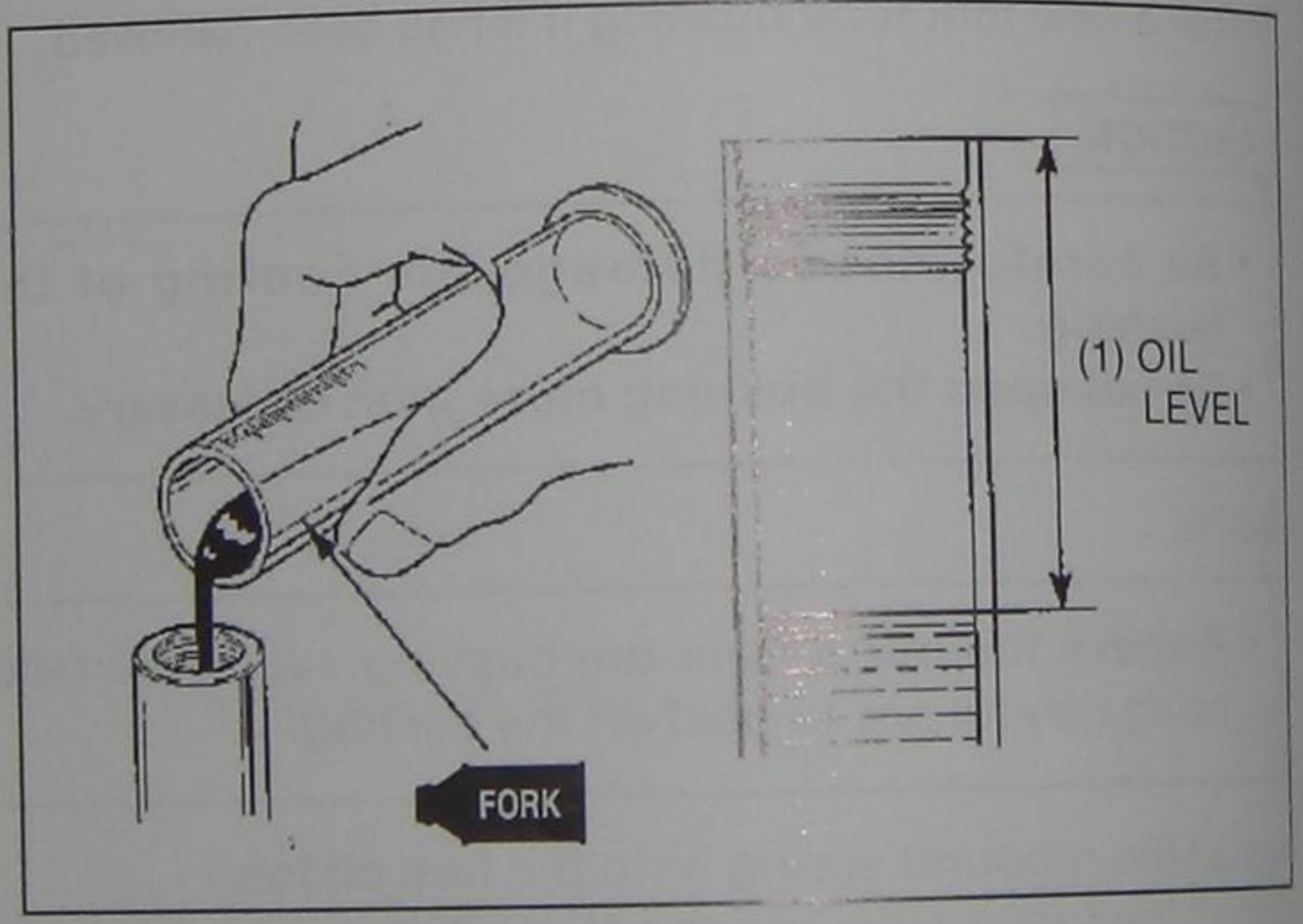

FORK
NEW
(1) DUST SEAL
(2) STOPPER RING

Pour the specified amount of recommended fork fluid in the fork tube.

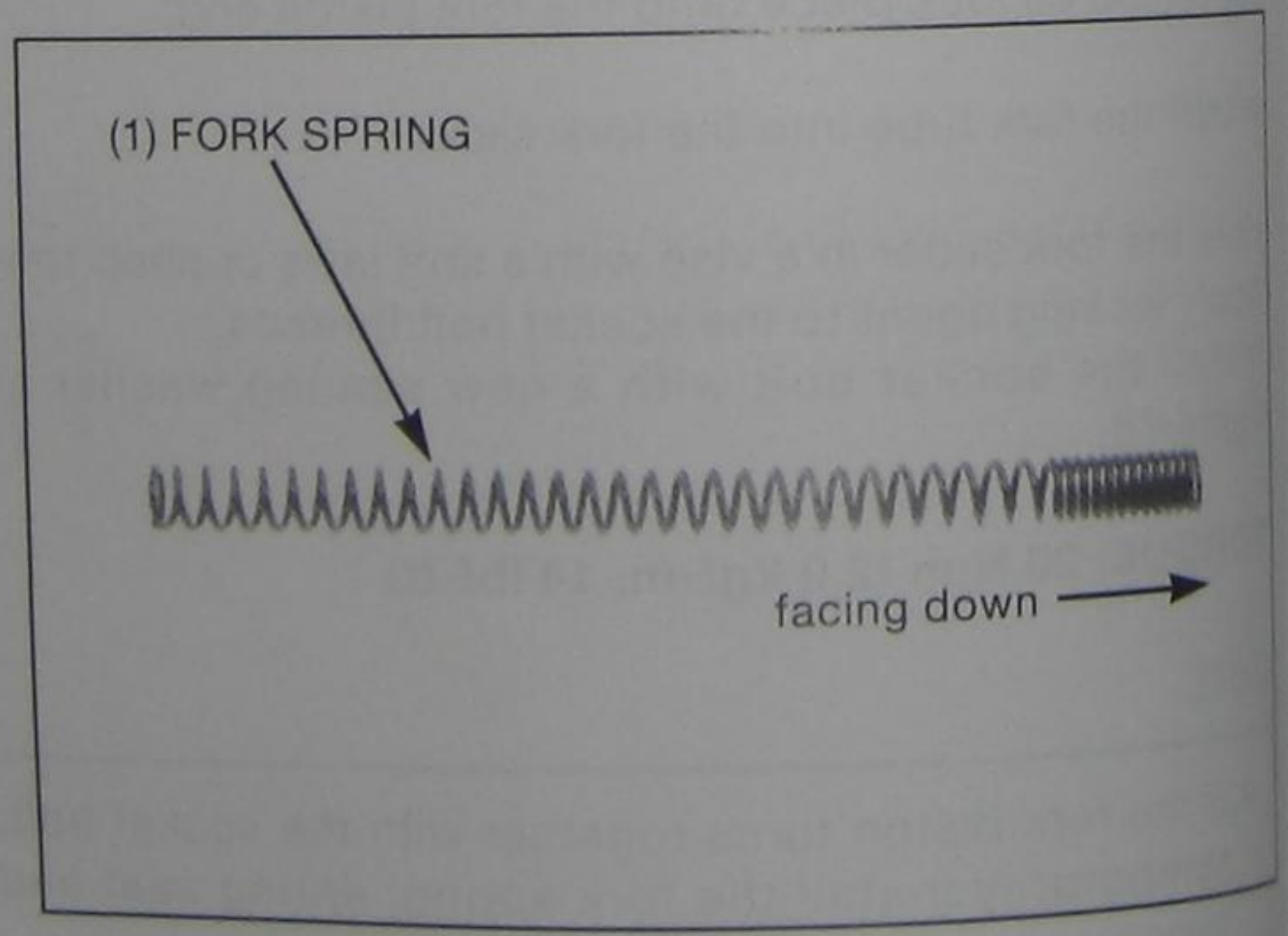
**RECOMMENDED FORK FLUID: Fork fluid**
**FORK FLUID CAPACITY:**
**384 cm³ (12.9 US oz, 13.5 Imp oz)**

Slowly pump the fork tube several times to remove trapped air from the lower portion of the fork tube.
Compress the fork tube fully and measure the oil level from the top of the fork tube.

**FORK FLUID LEVEL: 140 mm (5.5 in)**


(1) OIL LEVEL
FORK

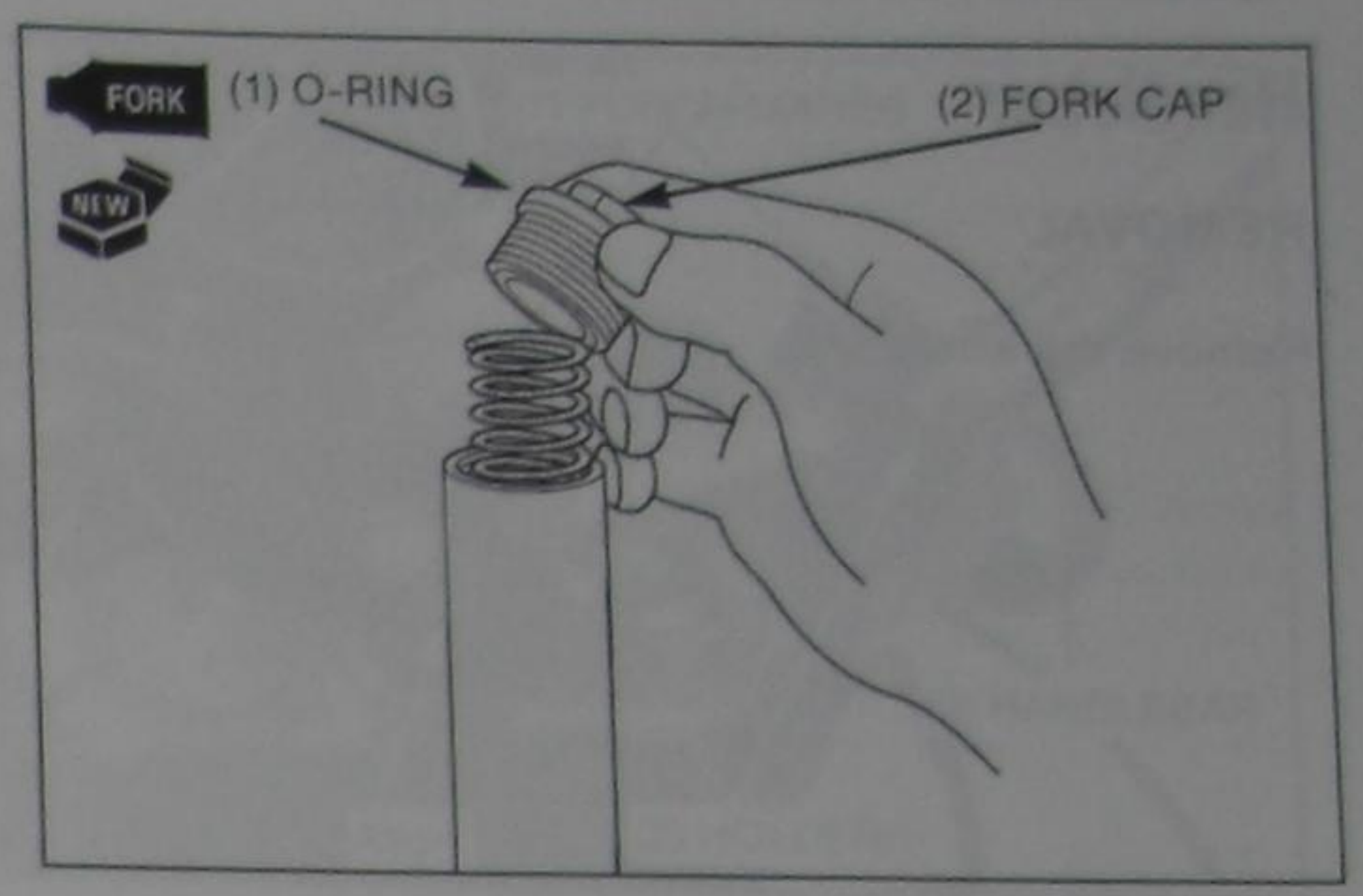
Pull up the fork tube fully and install the fork spring with the tightly wound end facing down.


(1) FORK SPRING
facing down

Coat a new O-ring with fork fluid and install it into the fork cap groove.
Install the fork cap.

NOTE:

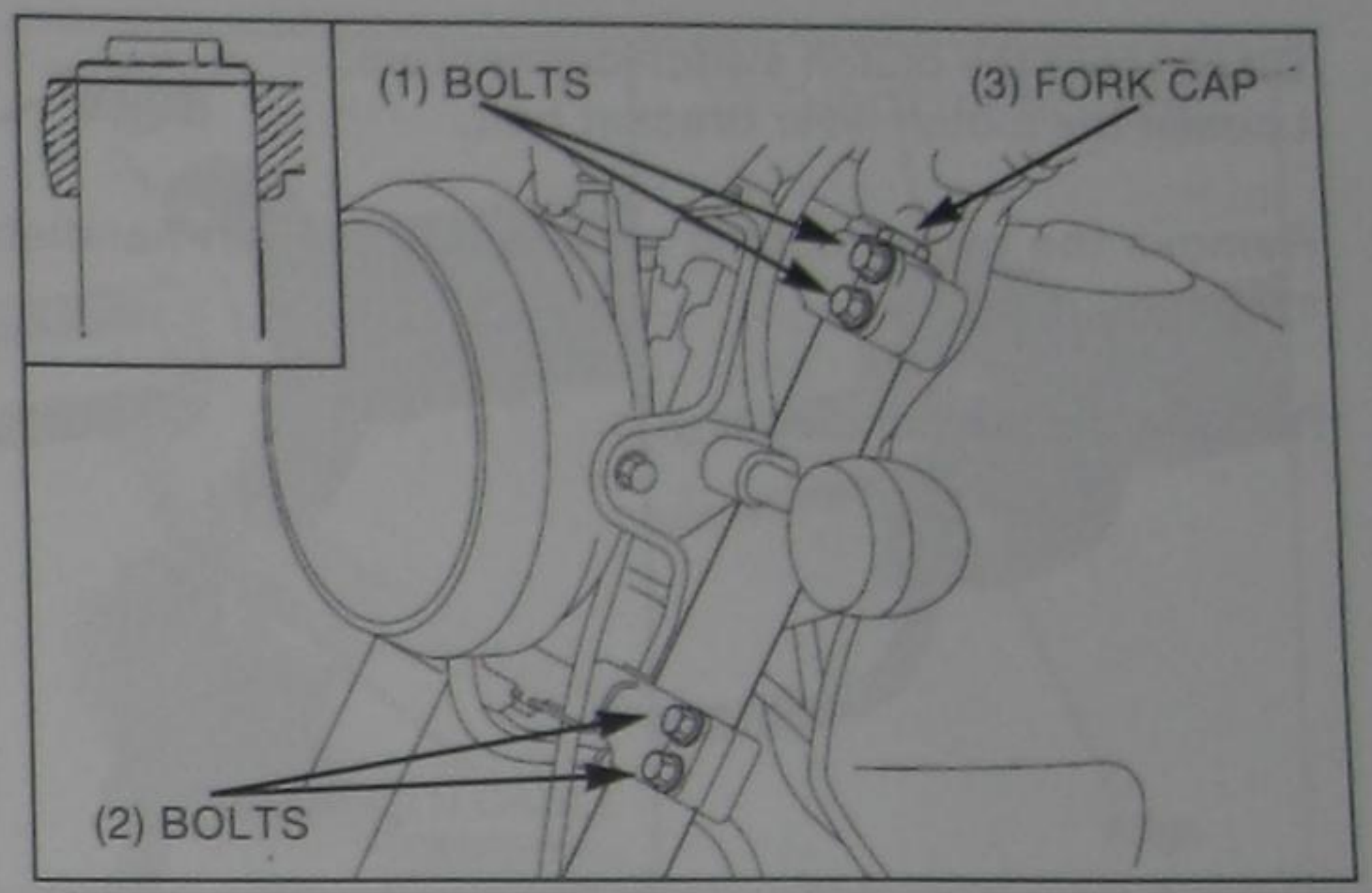
- Tighten the fork cap after installing the fork tube into the fork bridges.


FORK
NEW
(1) O-RING
(2) FORK CAP

## INSTALLATION

NOTE:

- Route the cables, wire harnesses and hose properly (page 1-16).


(1) BOLTS
(3) FORK CAP
(2) BOLTS

Install the fork tube into the bottom and top bridges.
Align the top end of the fork tube with the upper surface of the top bridge as shown and tighten the bottom bridge pinch bolts.

**TORQUE: 32 N·m (3.3 kgf-m, 24 lbf-ft)**

Tighten the fork cap of it was removed.

**TORQUE: 23 N·m (2.3 kgf-m, 17 lbf-ft)**

Tighten the top bridge pinch bolts.

**TORQUE: 27 N·m (2.8 kgf-m, 20 lbf-ft)**

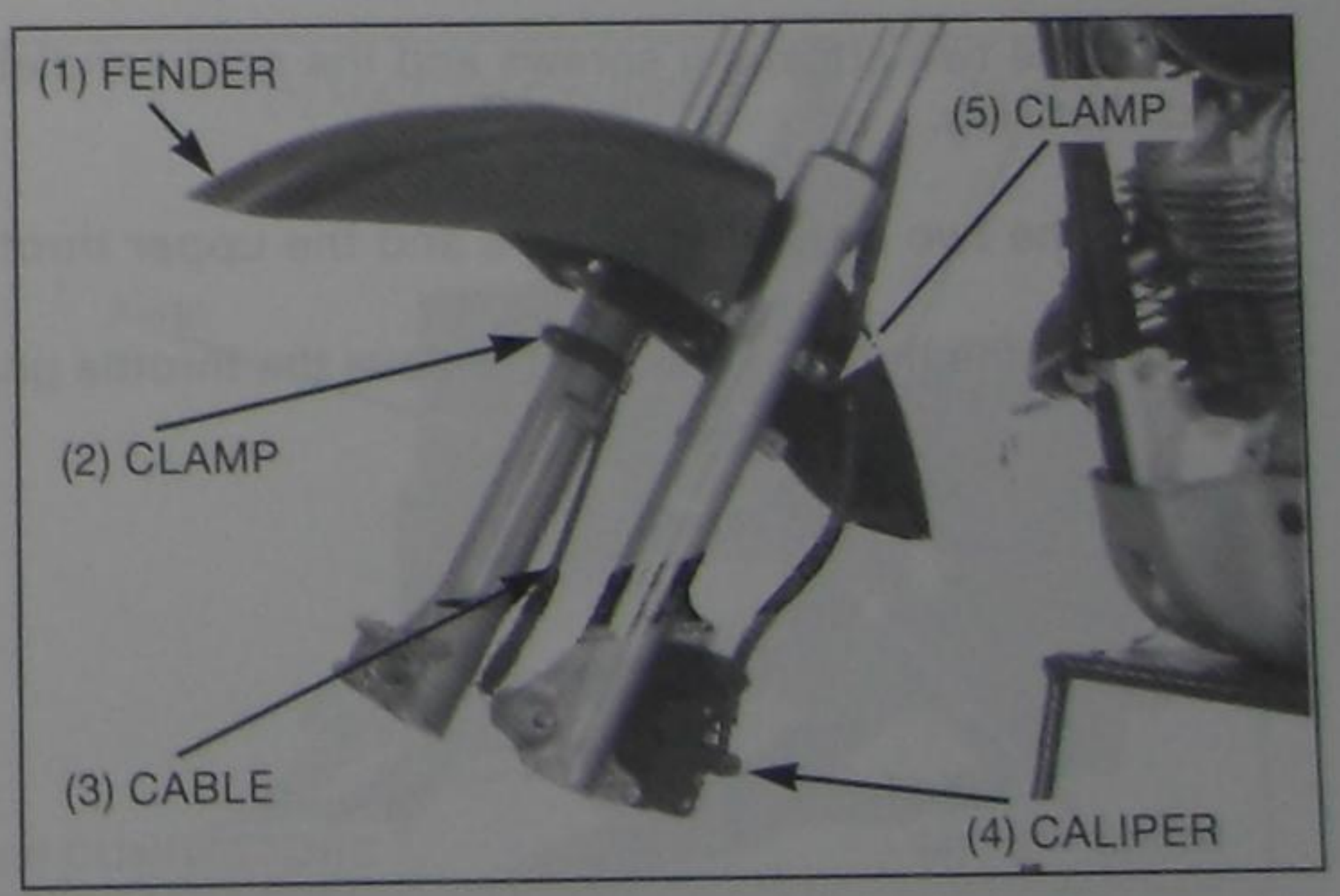
Install the brake caliper onto the fork leg with new mounting bolts.

**TORQUE: 30 N·m (3.1 kgf-m, 22 lbf-ft)**

Install the front fender with the hose clamp and four bolts.

Install the speedometer cable with the cable clamp, nut and screw.

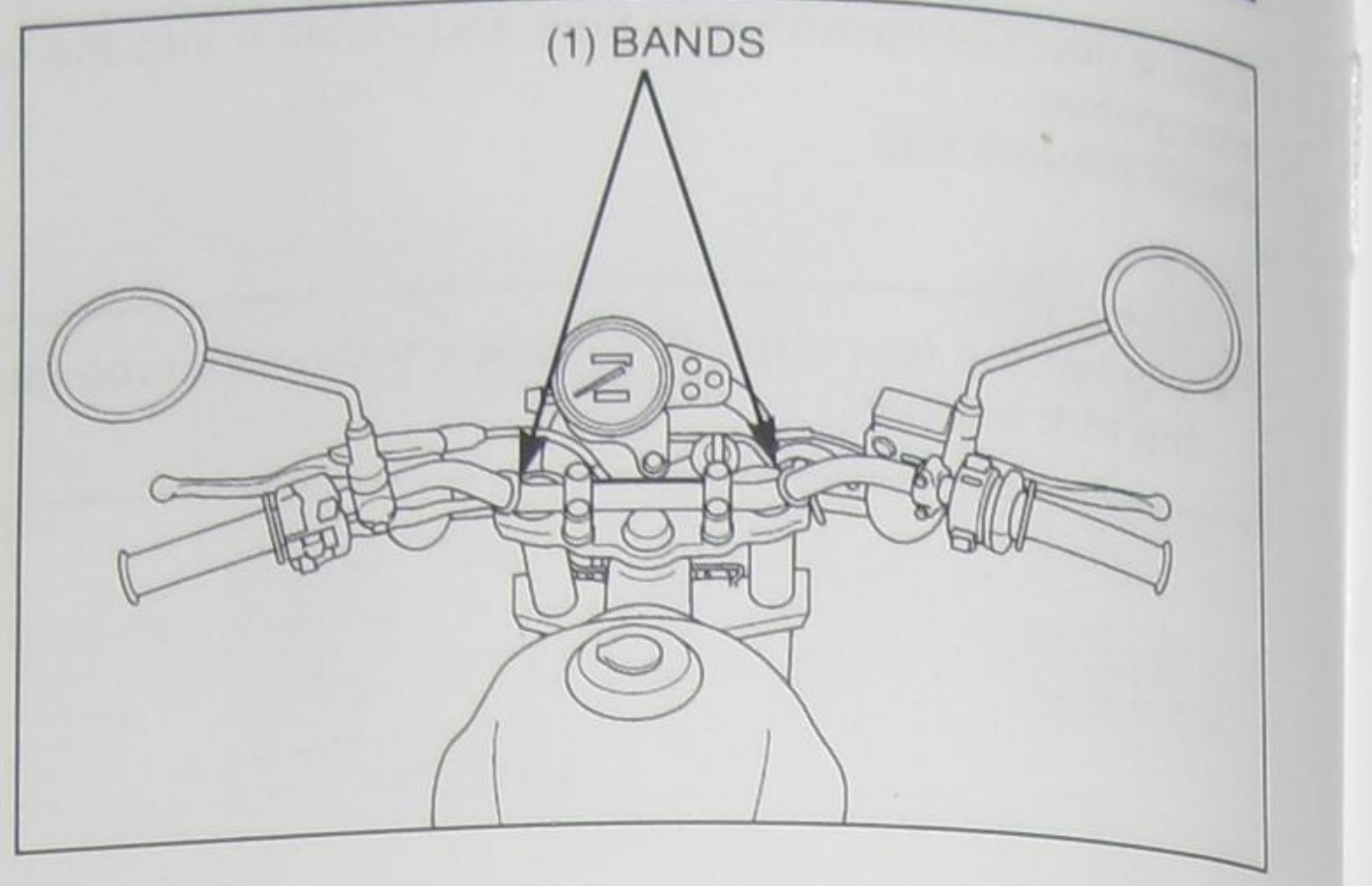
Install the front wheel (page 12-6).


(1) FENDER
(5) CLAMP
(2) CLAMP
(3) CABLE
(4) CALIPER

## Handlebar

### REMOVAL

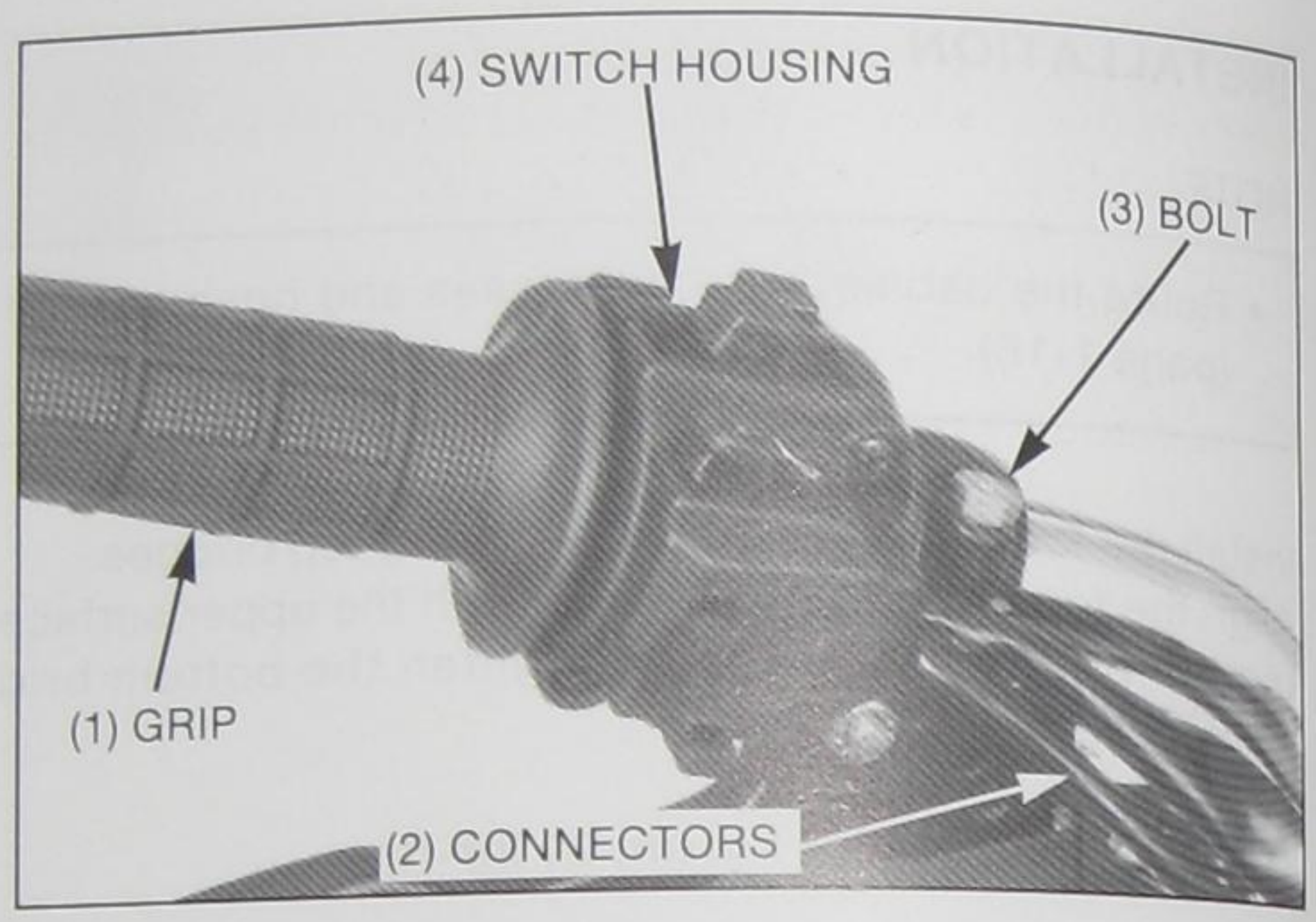
Remove the wire bands.



Disconnect the clutch switch connectors.
Loosen the clutch lever bracket bolt.

Remove the two attaching screws and the left handlebar switch housing.

Remove the left handlebar grip.

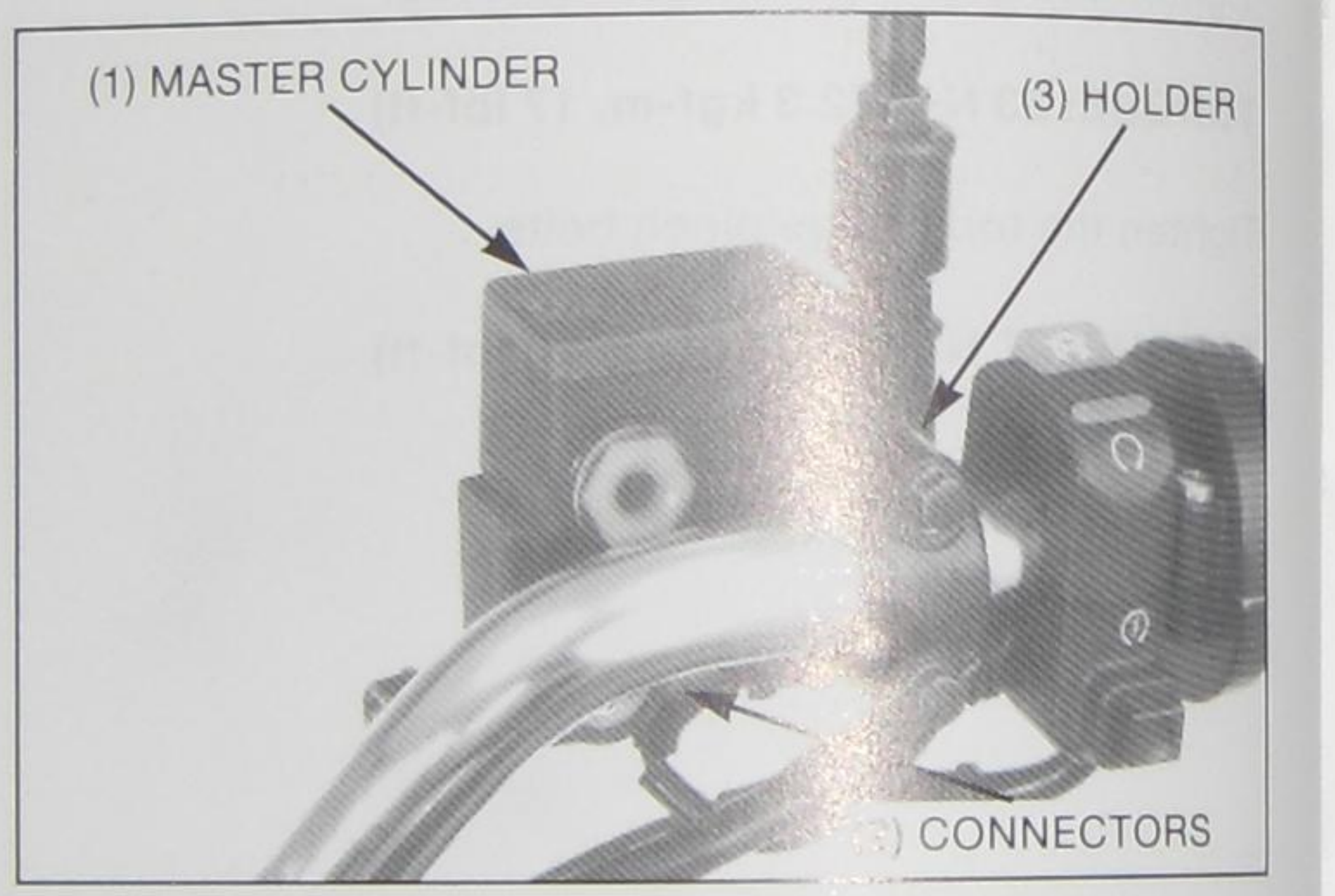

(4) SWITCH HOUSING
(3) BOLT
(1) GRIP
(2) CONNECTORS

Disconnect the brake light switch connectors.

Remove the two bolts, holder and the master cylinder.

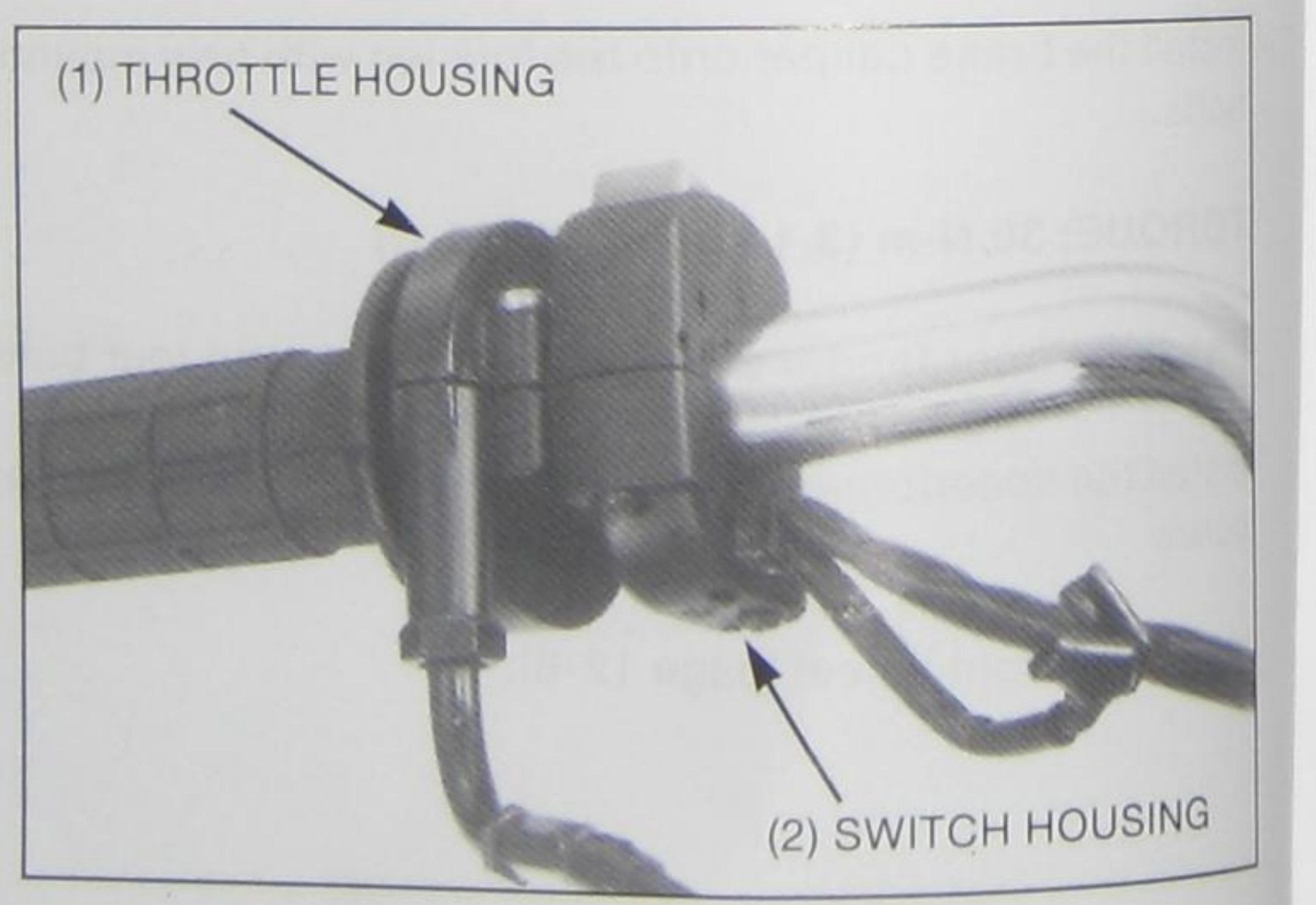
NOTE:

- Keep the master cylinder upright to prevent air from entering the hydraulic system.


(1) MASTER CYLINDER
(3) HOLDER
CONNECTORS

Remove the two attaching screws and the right handlebar switch housing.

Remove the two attaching screws and the upper throttle housing.
Disconnect the throttle cable and remove the throttle grip.


(1) THROTTLE HOUSING
(2) SWITCH HOUSING

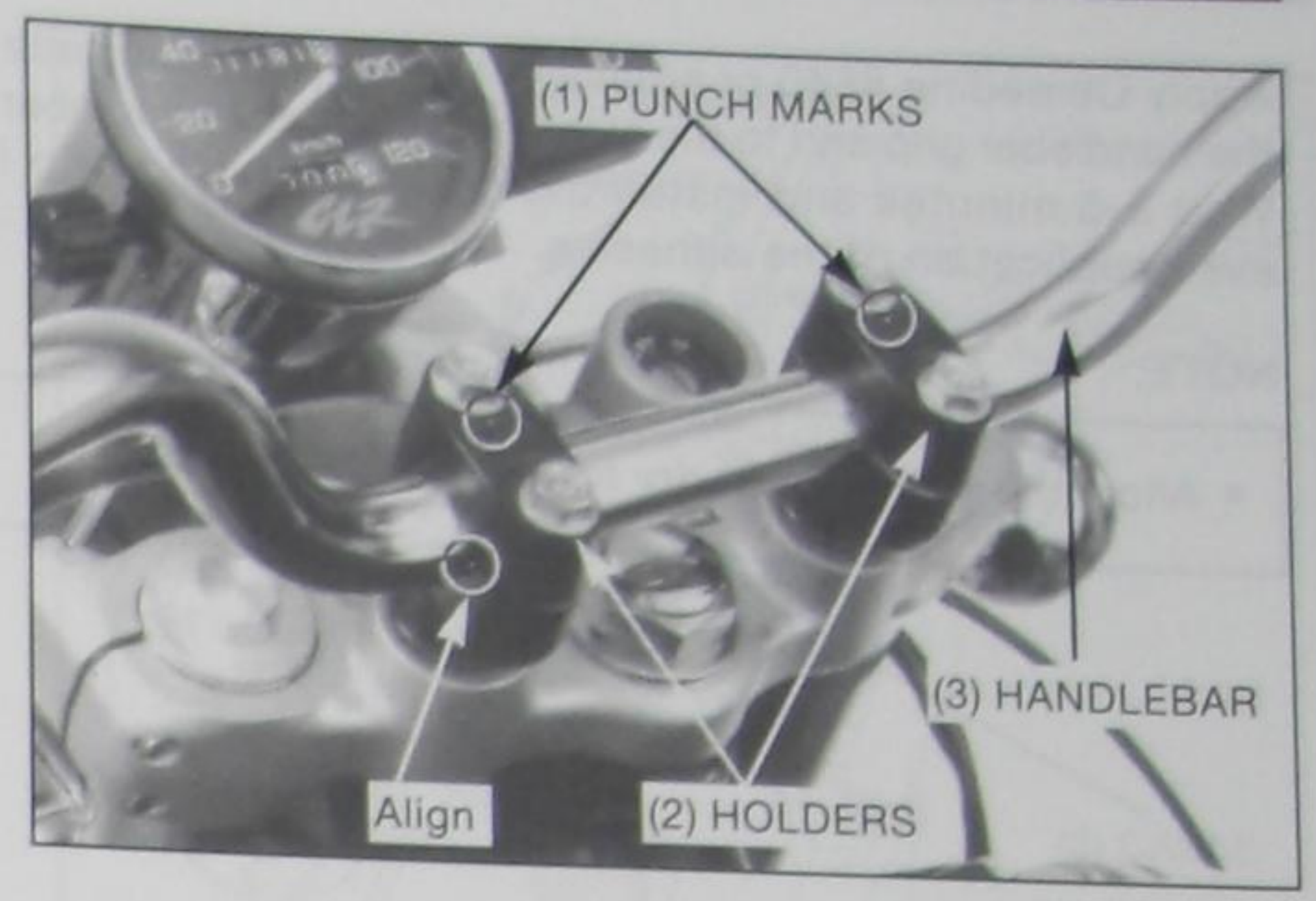
Remove the four bolts and the upper holders.
Remove the handlebar from the lower holders.

Remove the clutch lever bracket.

### INSTALLATION

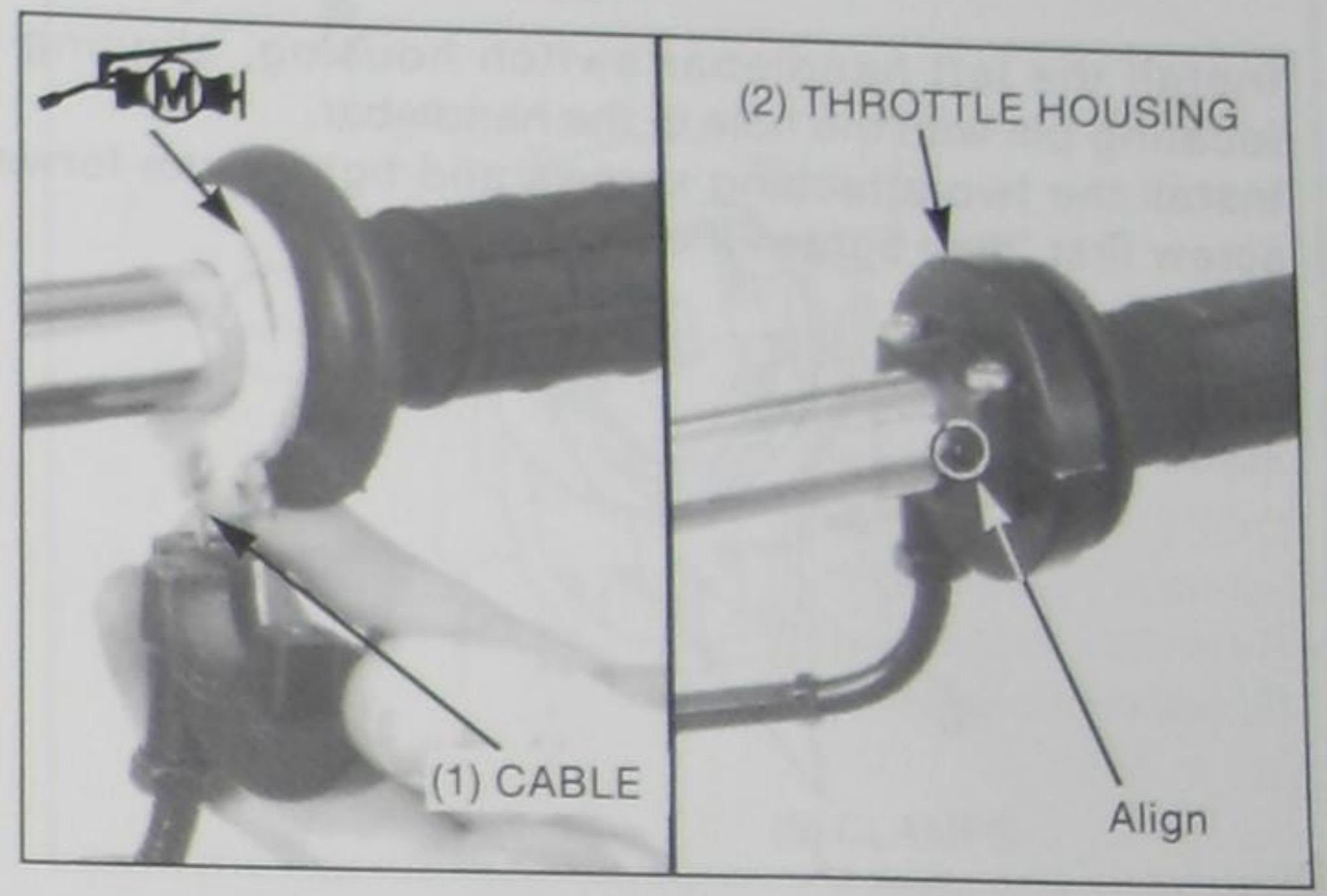
Install the clutch lever bracket onto the handlebar.

Place the handlebar onto the lower holders and align the punch mark on the handlebar with the top of the lower holder. Install the upper holders with the punch marks facing forward. Install the four bolts and tighten the forward bolts first, then tighten the rear bolts.

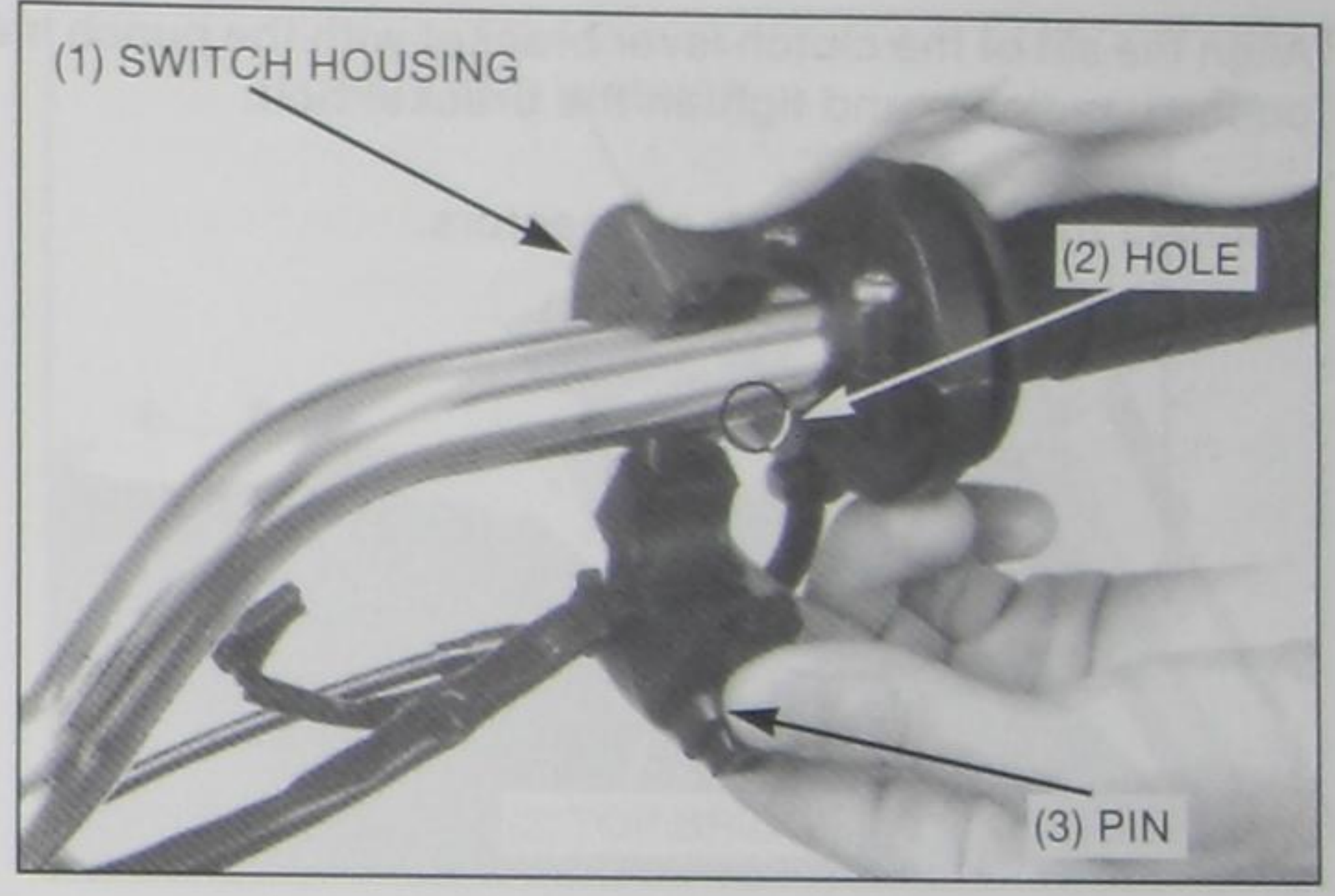

(1) PUNCH MARKS
(3) HANDLEBAR
Align
(2) HOLDERS

Apply molybdenum disulfide grease to the throttle grip flange groove and sliding surface.
Install the throttle grip onto the handlebar and connect the throttle cable to the throttle grip flange.

Install the upper throttle housing with the two screws.
Align the slit if the throttle housing with the punch mark on the handlebar, and tighten the forward screw first, then tighten the rear screw.

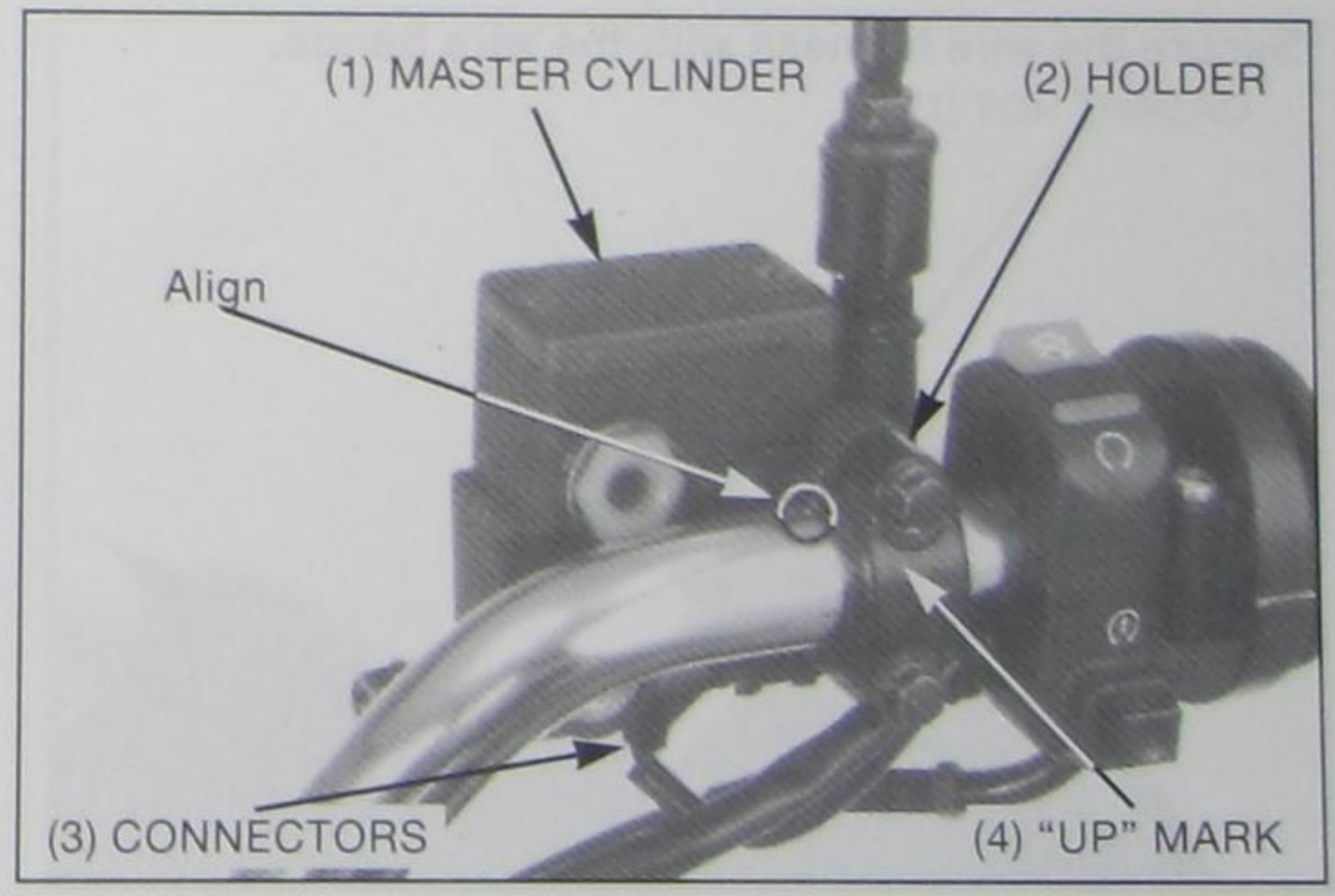

M
(1) CABLE
(2) THROTTLE HOUSING
Align

Install the right handlebar switch housing, aligning its locating pin with the hole in the handlebar.
Install the two attaching screws and tighten the forward screw first, then tighten the rear screw.


(1) SWITCH HOUSING
(2) HOLE
(3) PIN

Install the master cylinder and holder with the "UP" mark facing up.
Align the slit of the master cylinder with the punch mark on the handlebar, and tighten the upper bolt first, then lower bolt.

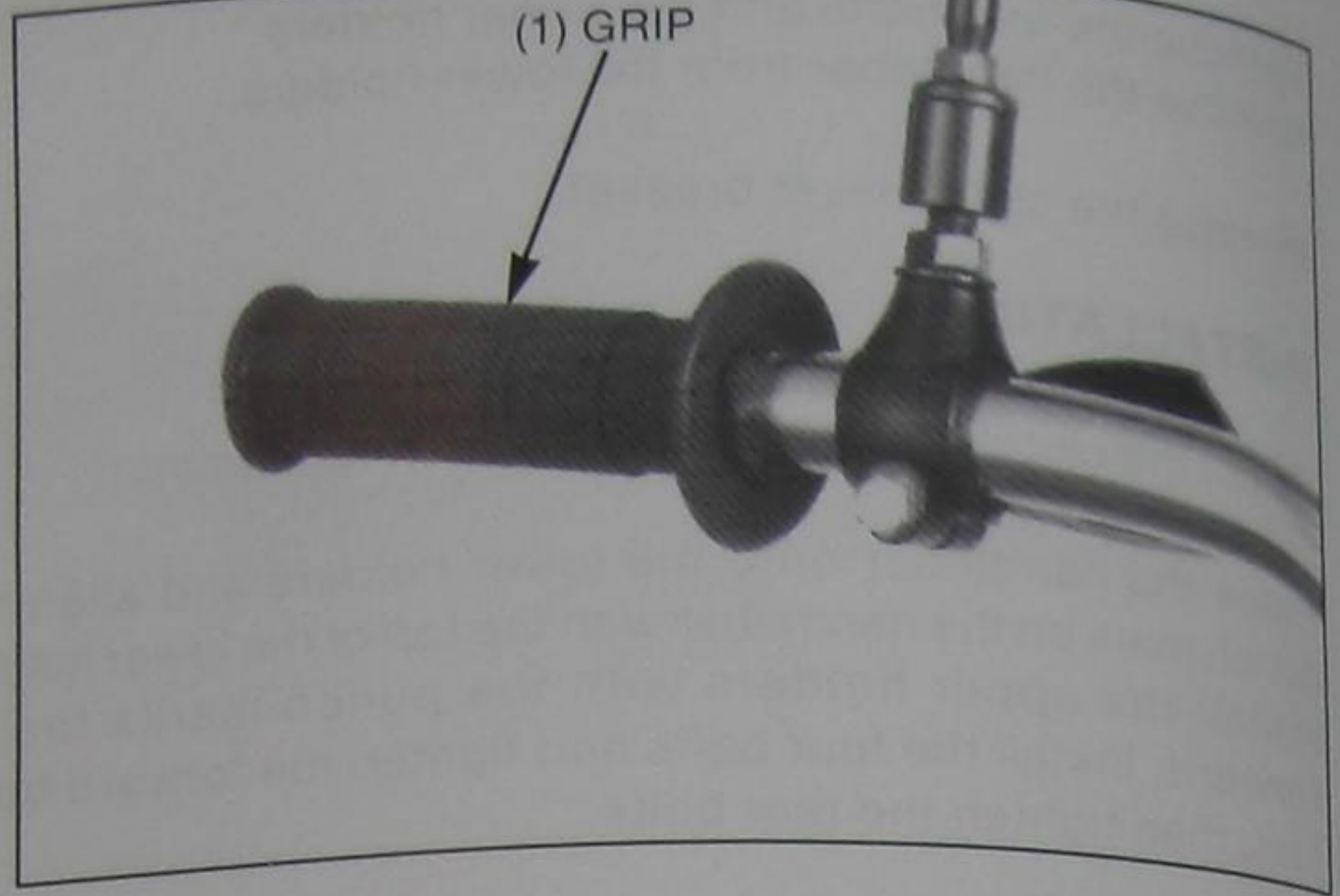
Connect the brake light switch connectors.


(1) MASTER CYLINDER
(2) HOLDER
Align
(3) CONNECTORS
(4) "UP" MARK

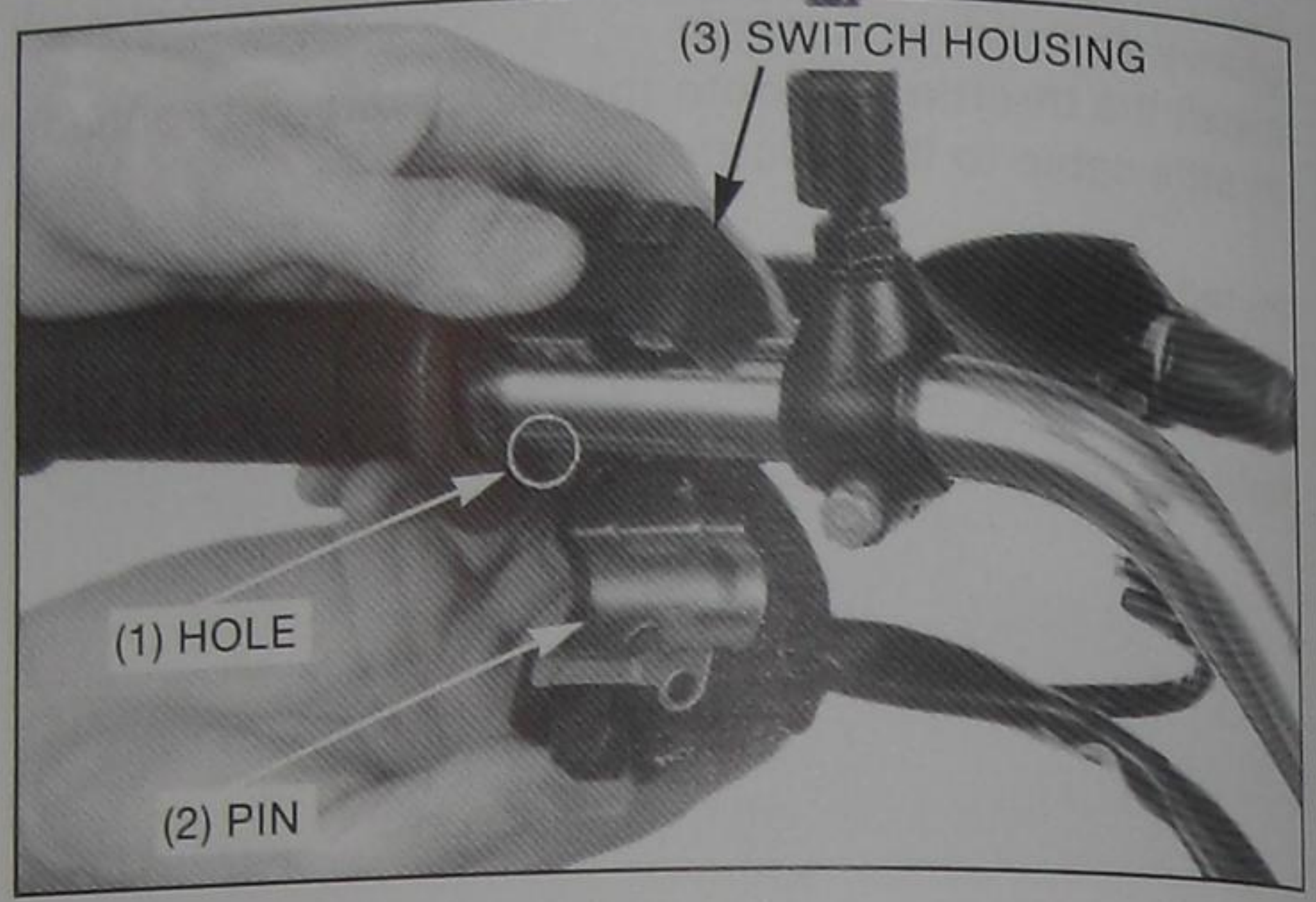
Apply Cemedine #540 or equivalent to the inside surface of the handlebar grip and to the clean surface of the handlebar. Wait 3-5 minutes and install the grip. Rotate the grip for even application of the adhesive.

NOTE:

- Allow the adhesive to dry for an hour before using.

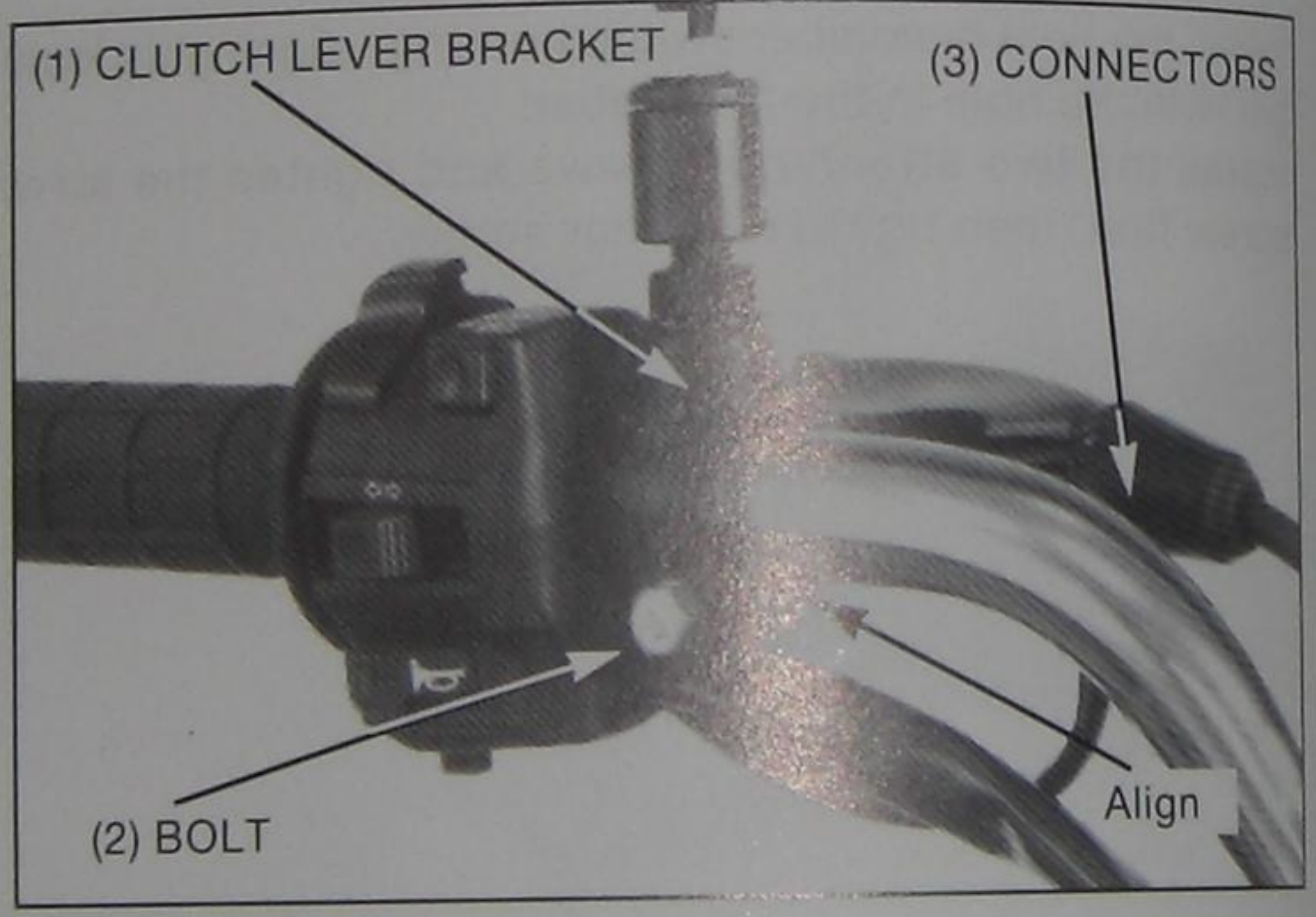


Install the left handlebar switch housing, aligning its locating pin with the hole in the handlebar. Install the two attaching screws and tighten the forward screw first, then tighten the rear screw.

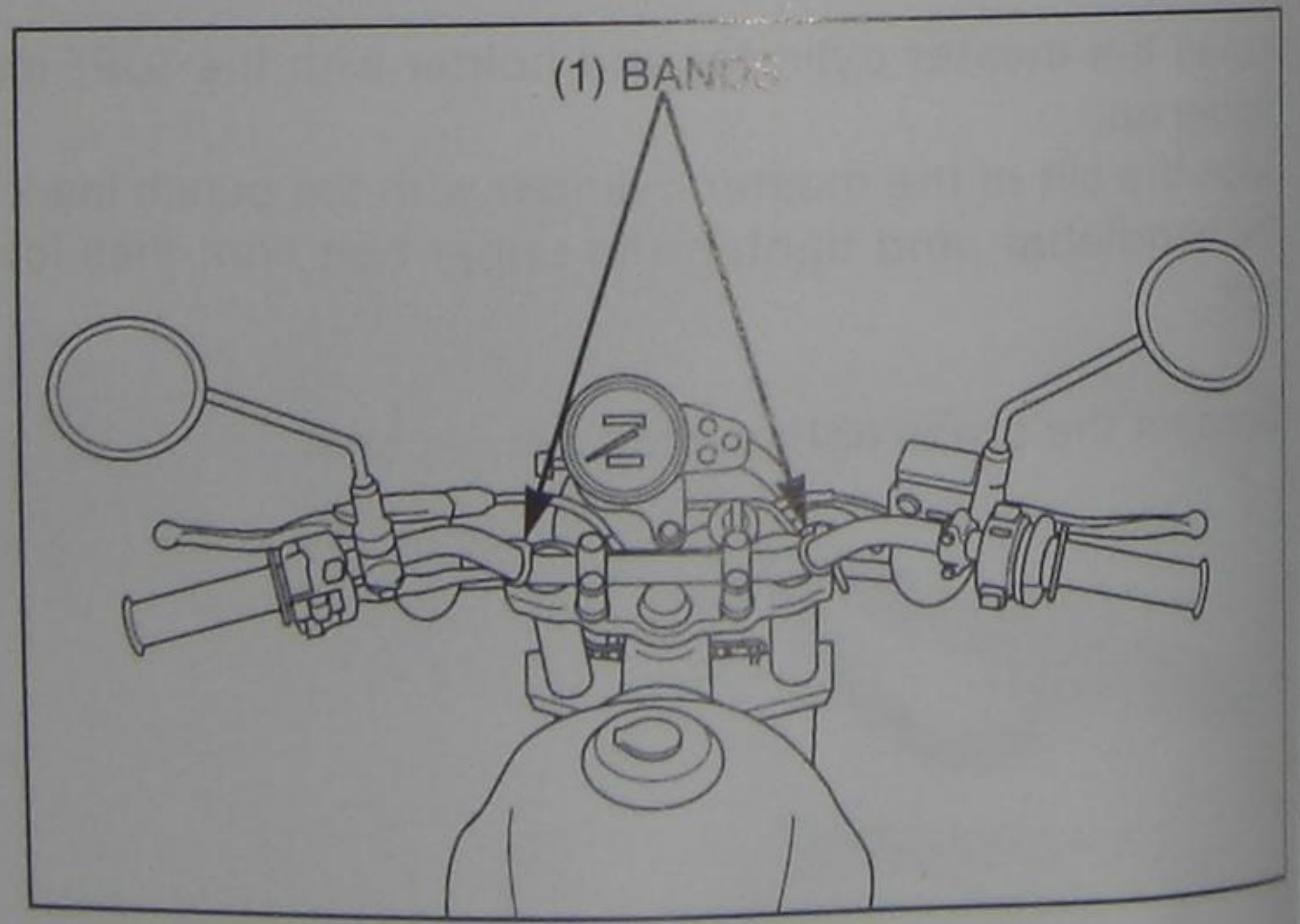

(3) SWITCH HOUSING
(1) HOLE
(2) PIN

Align the slit of the clutch lever bracket with the punch mark on the handlebar and tighten the bracket bolt.

Connect the clutch switch connectors.


(1) CLUTCH LEVER BRACKET
(3) CONNECTORS
(2) BOLT
Align

Secure the wire harness with the wire bands.



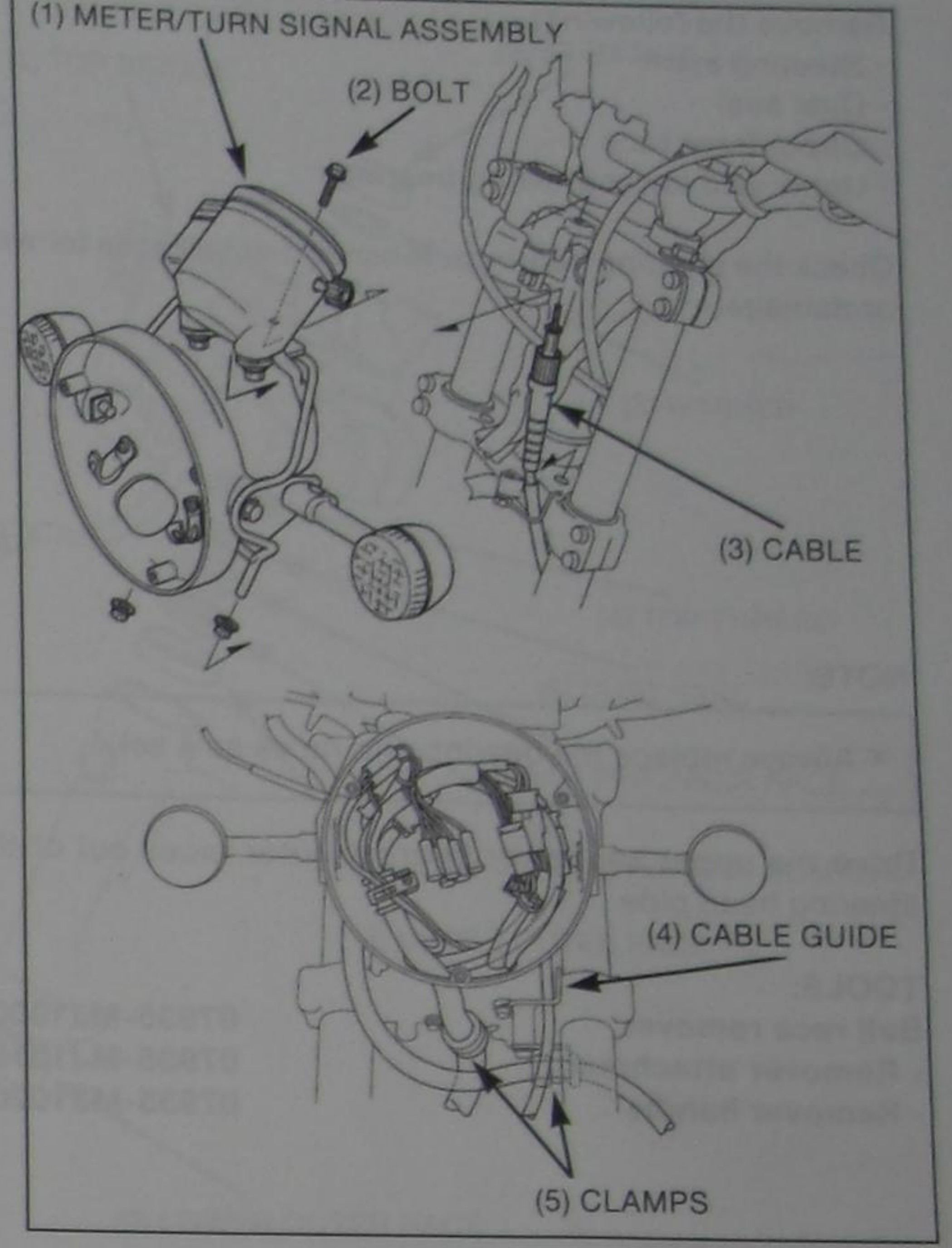
## Steering Stem

### REMOVAL

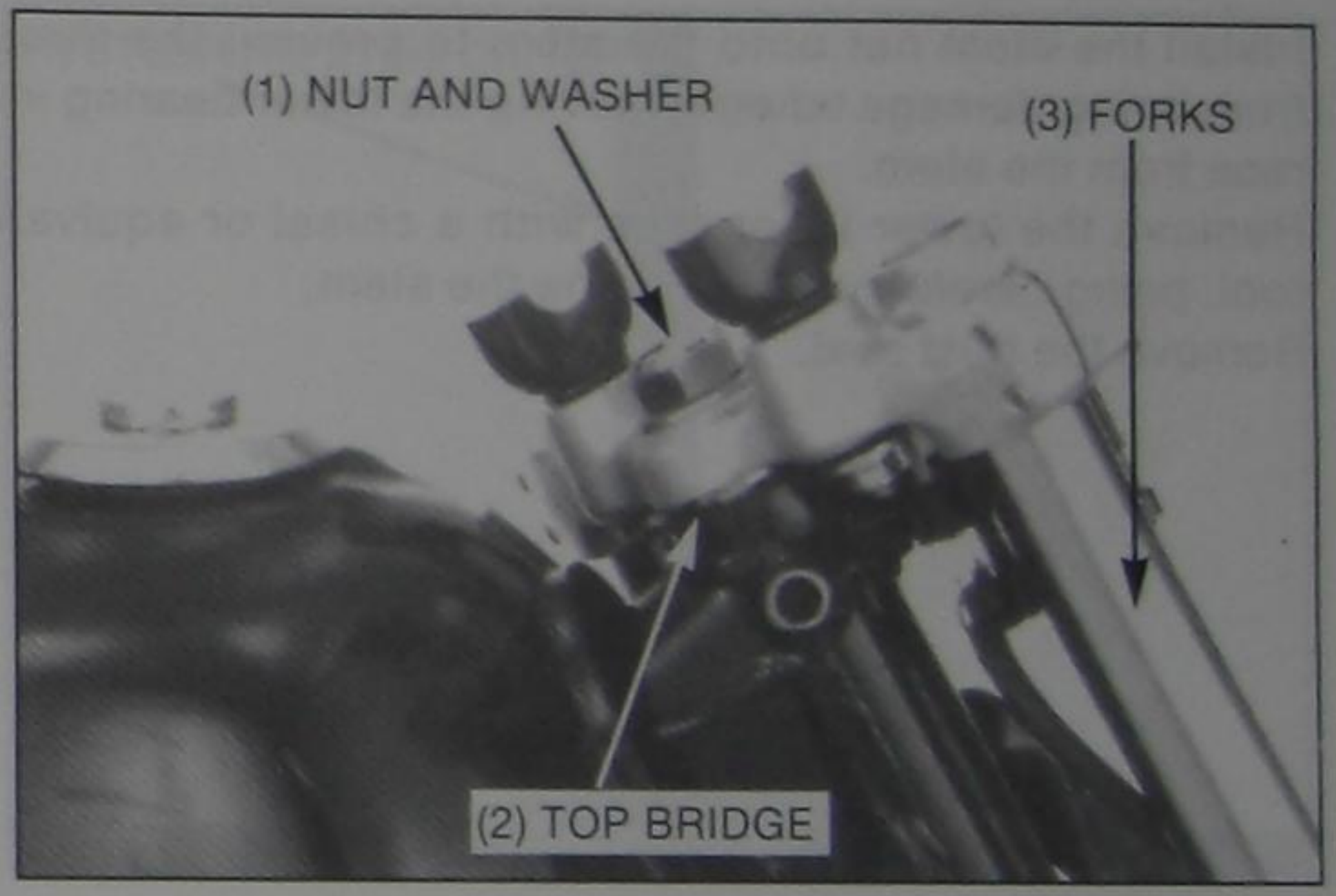
Remove the headlight (page 18-2).
Disconnect the connectors inside the headlight case.
Disconnect the speedometer cable from the speedometer.
Remove the bolt and the meter/turn signal assembly from the fork bottom bridge.

Remove the wire harness clamp, brake hose clamp and speedometer cable guide by removing the bolts from the bottom bridge.

Remove the following:
- Handlebar (page 12-14)
- Left and right forks (page 12-7).


(1) METER/TURN SIGNAL ASSEMBLY
(2) BOLT
(3) CABLE
(4) CABLE GUIDE
(5) CLAMPS

Temporarily install the forks into the fork bridges.
Loosen the steering stem nut.
Remove the forks, stem nut, washer and fork top bridge.

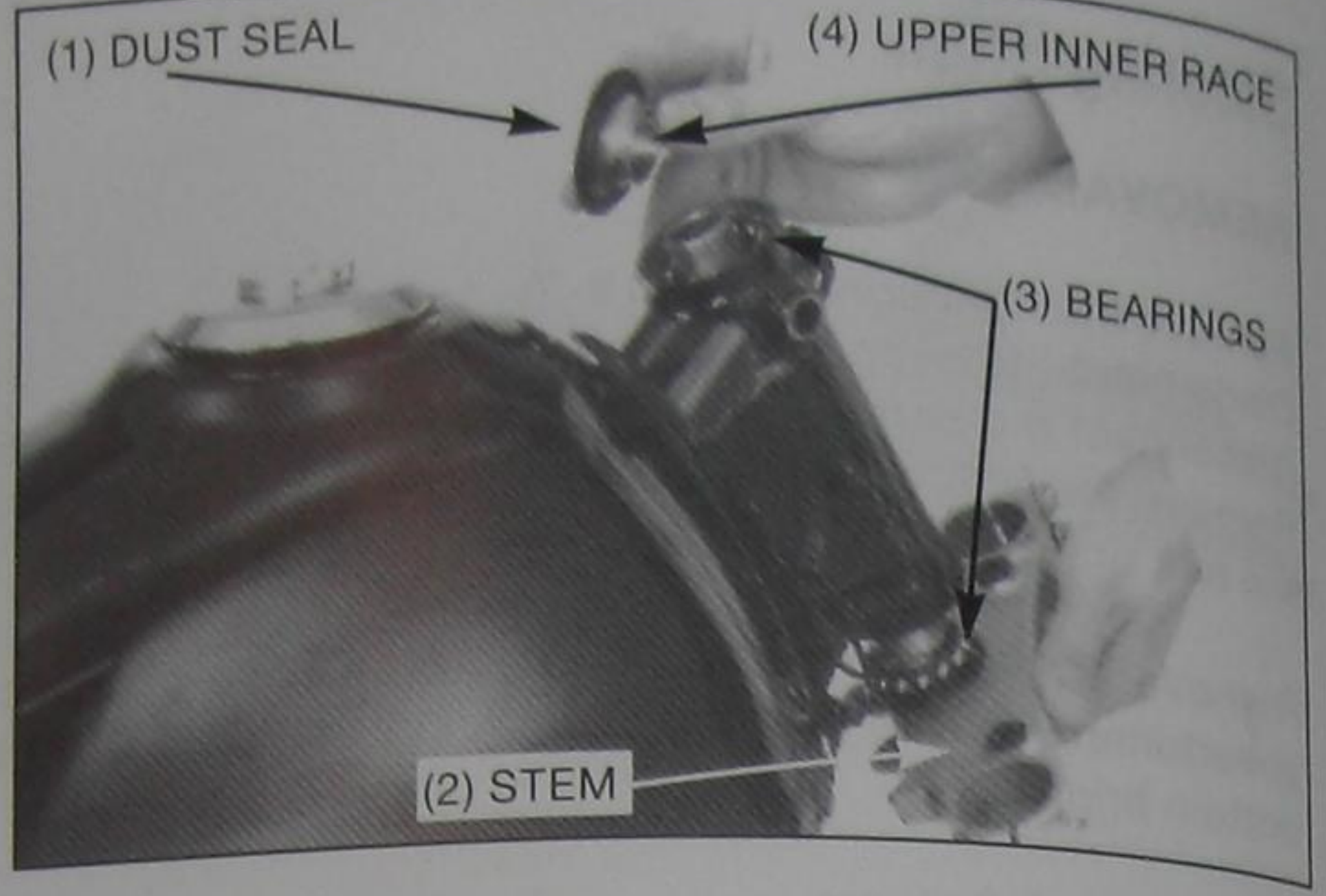

(1) NUT AND WASHER
(3) FORKS
(2) TOP BRIDGE

Loosen the steering top thread while holding the steering stem and remove the top thread.

(1) TOP THREAD

Remove the following:
- Steering stem
- Dust seal
- Upper inner race
- Upper and lower steering bearings.

Check the steering bearings, inner and outer races for wear or damage.


(1) DUST SEAL
(4) UPPER INNER RACE
(3) BEARINGS
(2) STEM

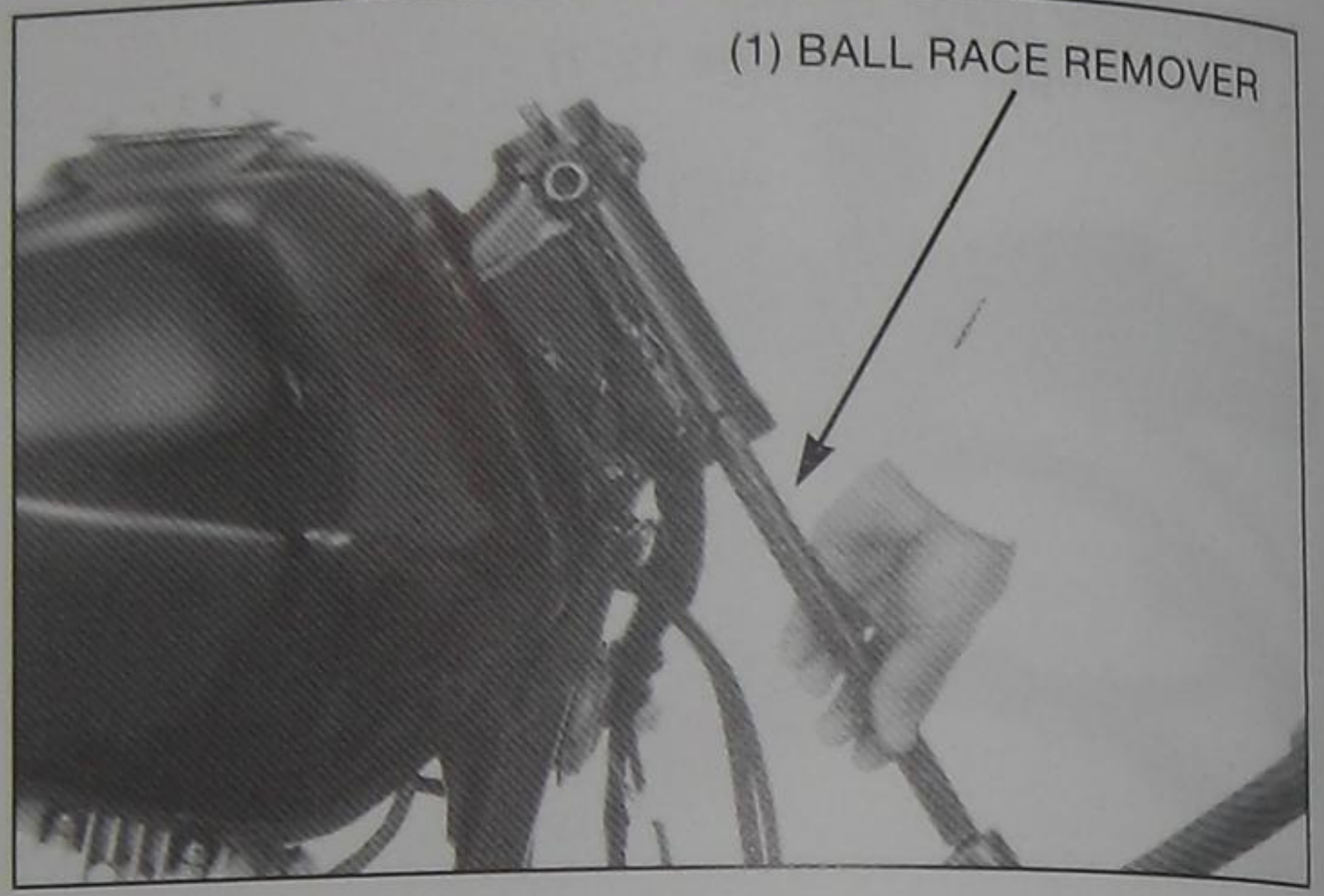
NOTE:

- Always replace the bearing and races as a set.

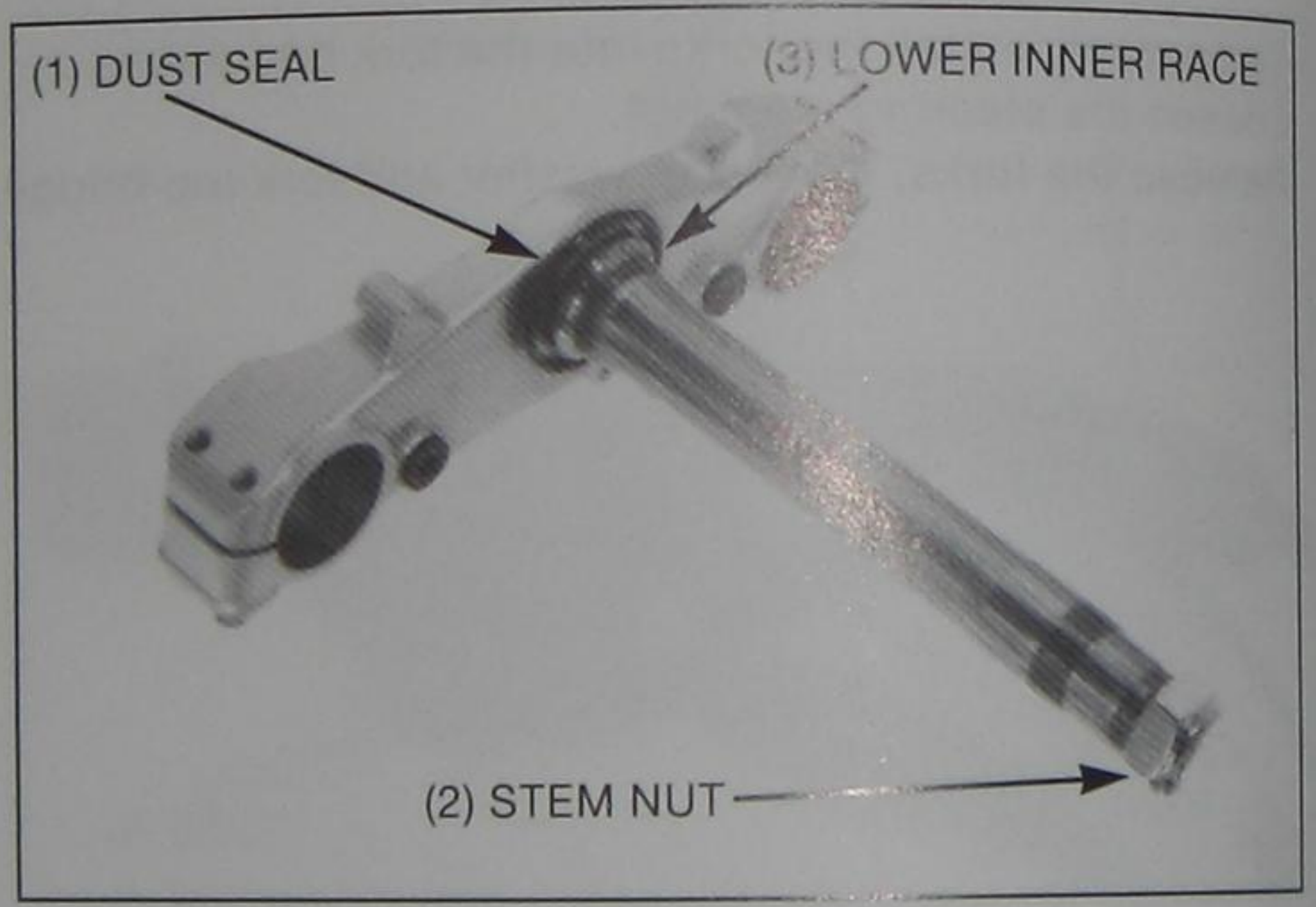
Drive the upper and lower bearing outer races out of the steering head pipe.

**TOOLS:**

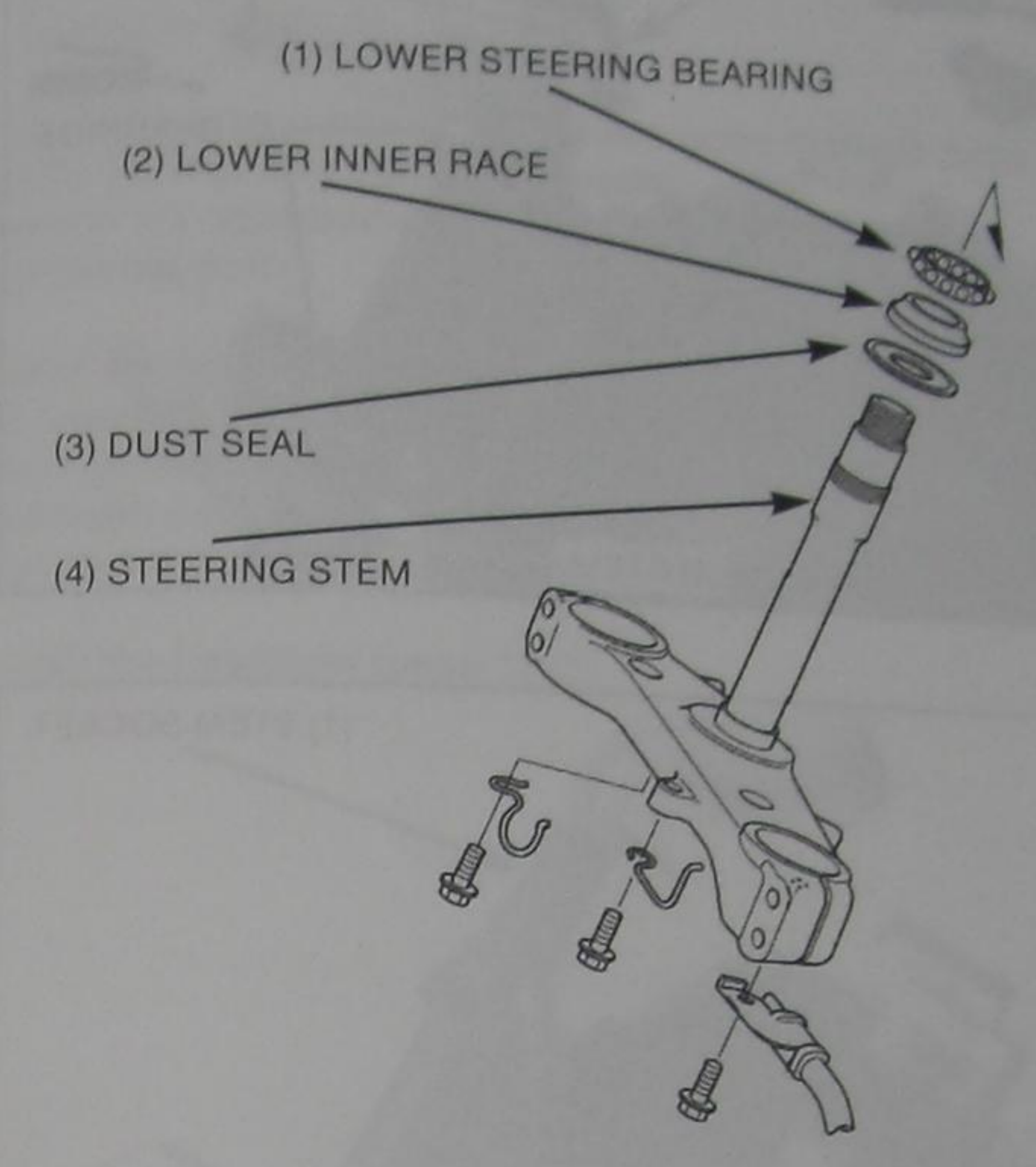
| | |
|---|---|
| **Ball race remover** | **07935-MJ10000** |
| **- Remover attachment** | **07935-MJ10100** |
| **- Remover handle** | **07935-MJ10200** |

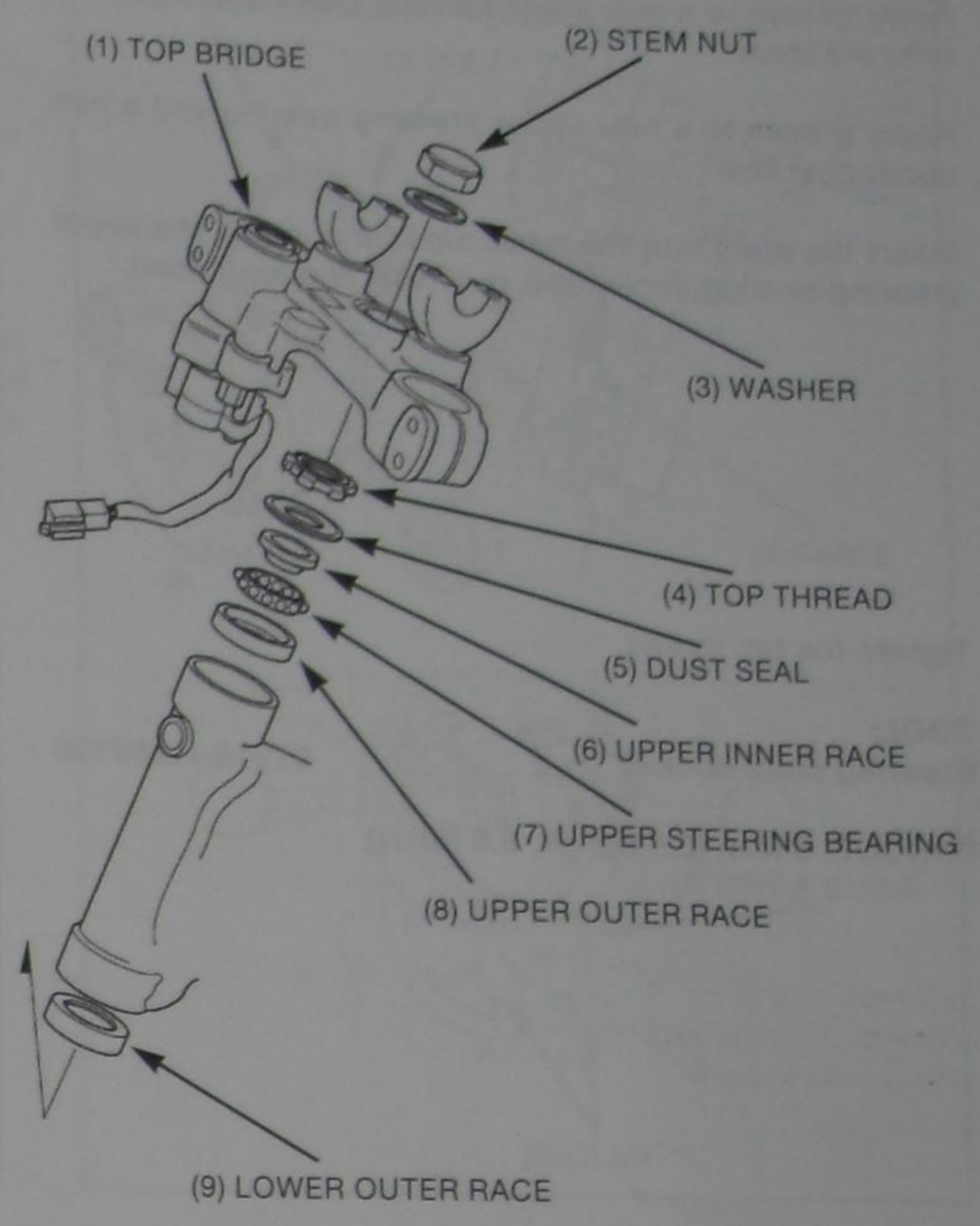

(1) BALL RACE REMOVER

Install the stem nut onto the stem to prevent the threads from being damage when removing the lower bearing inner race from the stem.
Remove the lower inner race with a chisel or equivalent tool, being careful not to damage the stem.
Remove the dust seal.


(1) DUST SEAL
(3) LOWER INNER RACE
(2) STEM NUT

## INSTALLATION

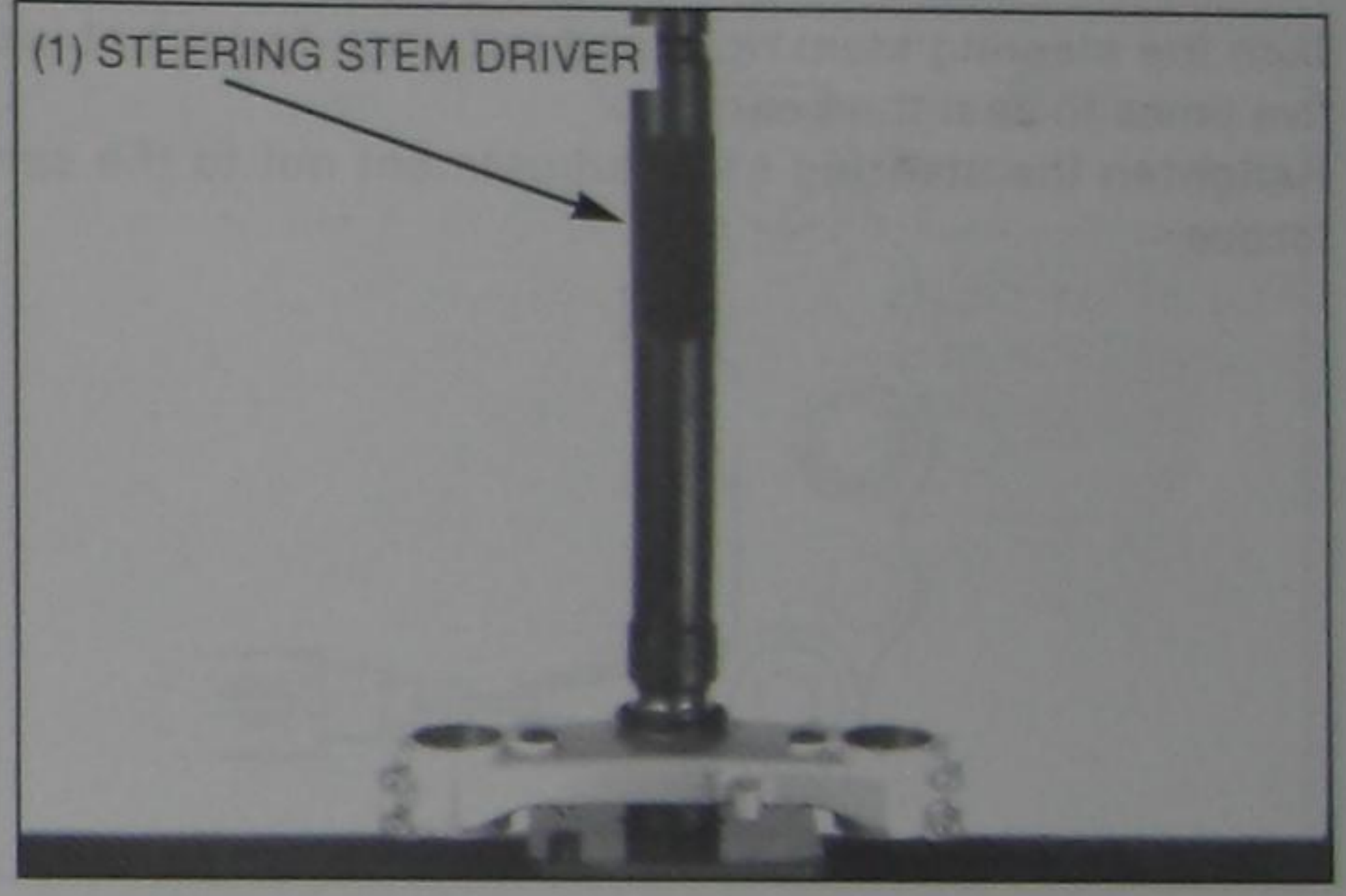

(1) LOWER STEERING BEARING
(2) LOWER INNER RACE
(3) DUST SEAL
(4) STEERING STEM


(1) TOP BRIDGE
(2) STEM NUT
(3) WASHER
(4) TOP THREAD
(5) DUST SEAL
(6) UPPER INNER RACE
(7) UPPER STEERING BEARING
(8) UPPER OUTER RACE
(9) LOWER OUTER RACE

Apply grease to a new lower dust seal lip and install it onto the steering stem.
Press a new lower inner race onto the steering stem using the special tool.

**TOOL:**

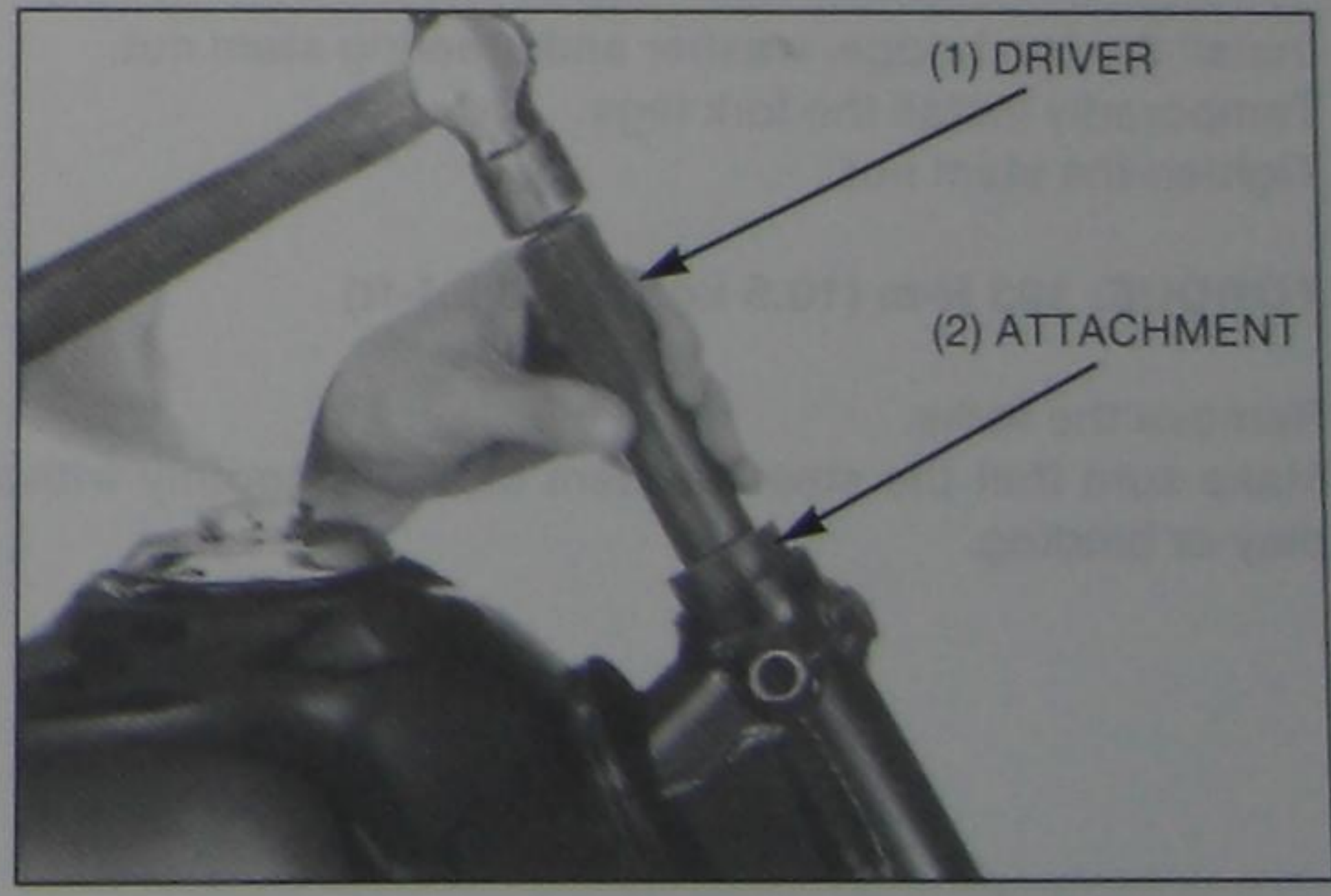
| | |
|---|---|
| **Steering stem driver** | **07946-4300101** |


(1) STEERING STEM DRIVER

Drive new upper and lower outer races into the steering head pipe.

**TOOLS:**

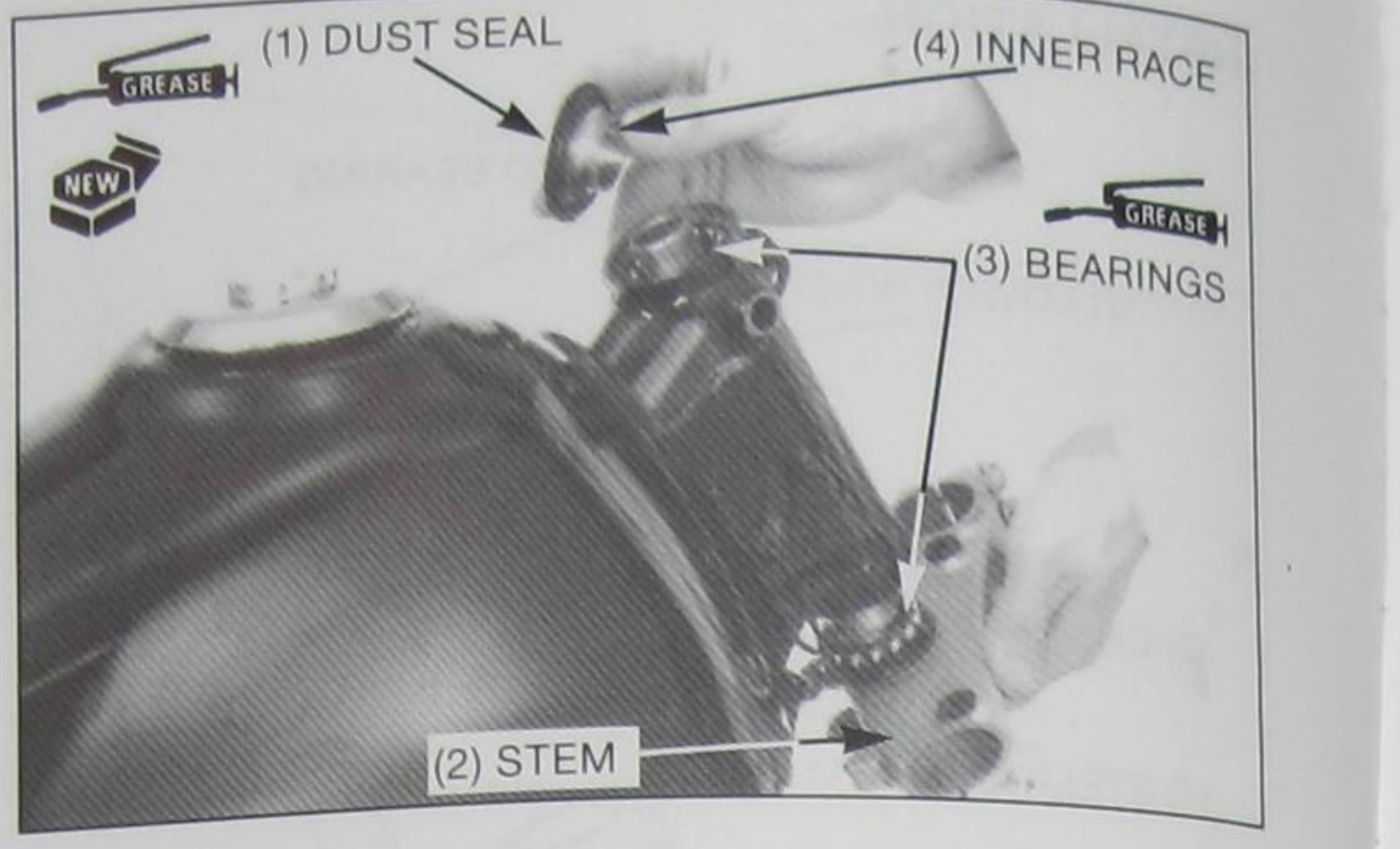
| | |
|---|---|
| **Driver** | **07749-0010000** |
| **Attachment, 42 x 47 mm** | **07746-0010300** |


(1) DRIVER
(2) ATTACHMENT

Apply grease to a new lower steering bearing and install it onto the stem.

Apply grease to a new upper steering bearing and a new upper dust seal.

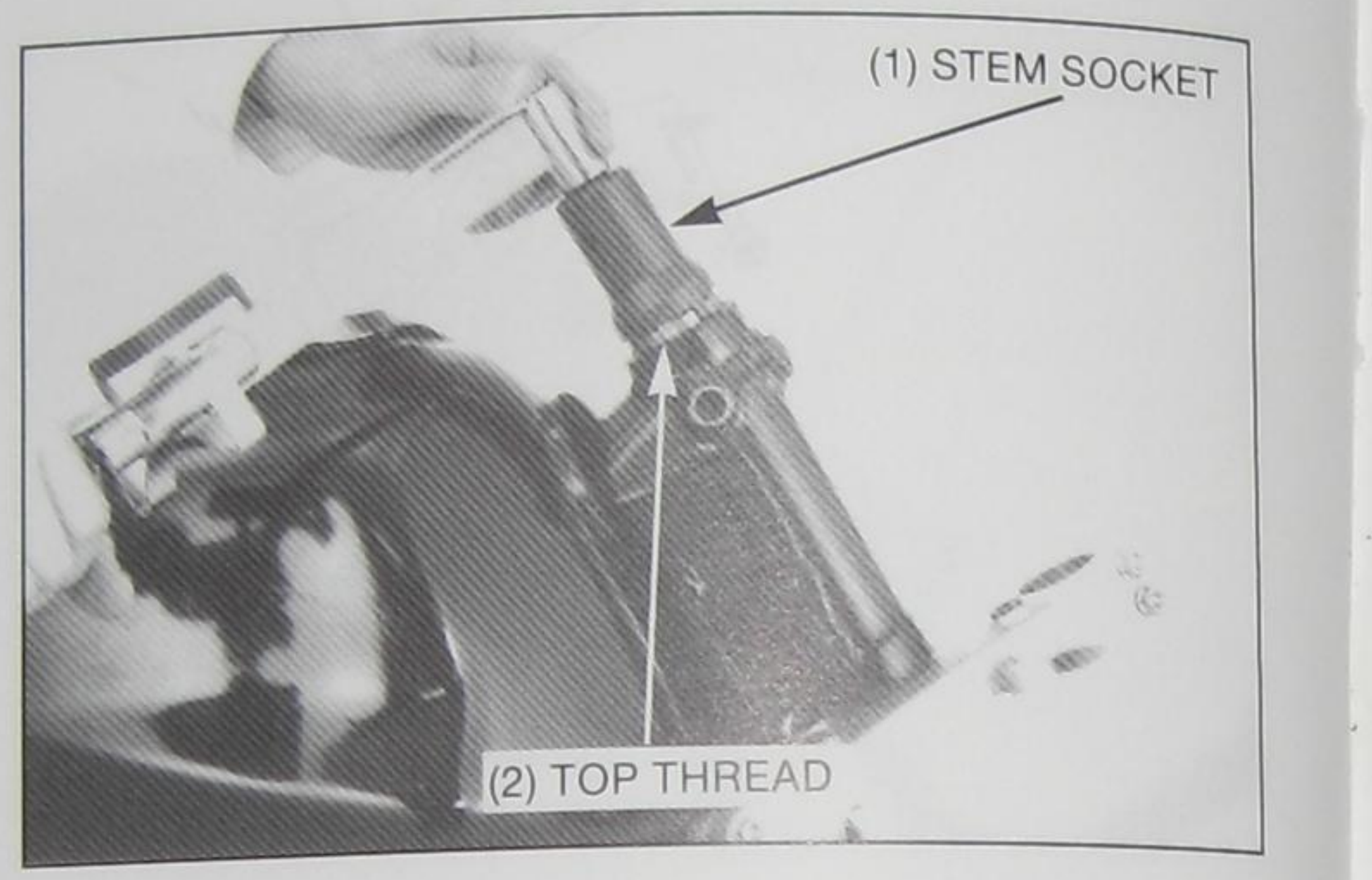
Insert the stem into the head pipe, and install the upper steering bearing, inner race, dust seal and top thread.



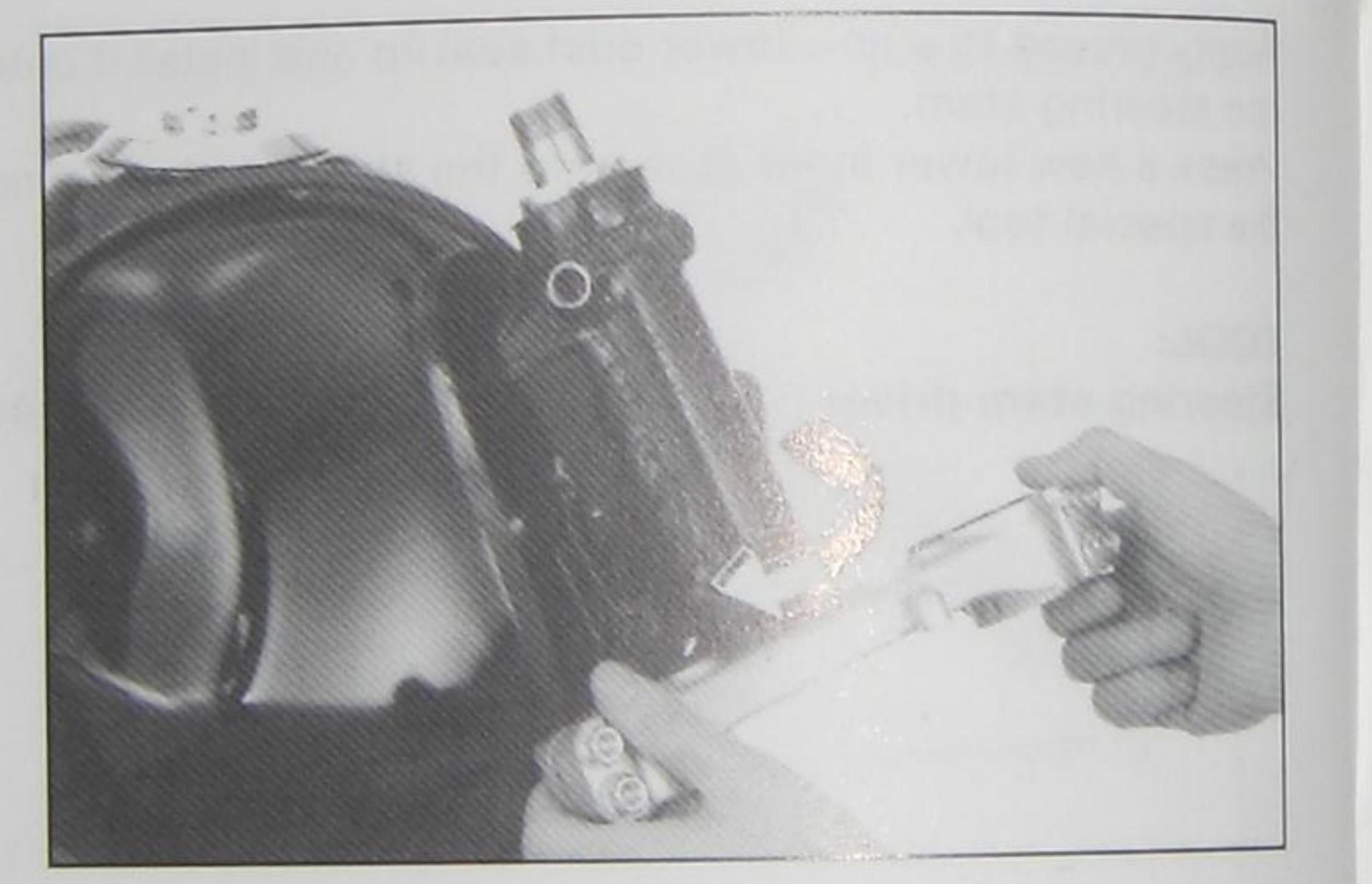
Tighten the top thread.

**TOOL:**
**Steering stem socket** **07916-KA50100**

**TORQUE: 5 N·m (0.5 kgf-m, 3.6 lbf-ft)**



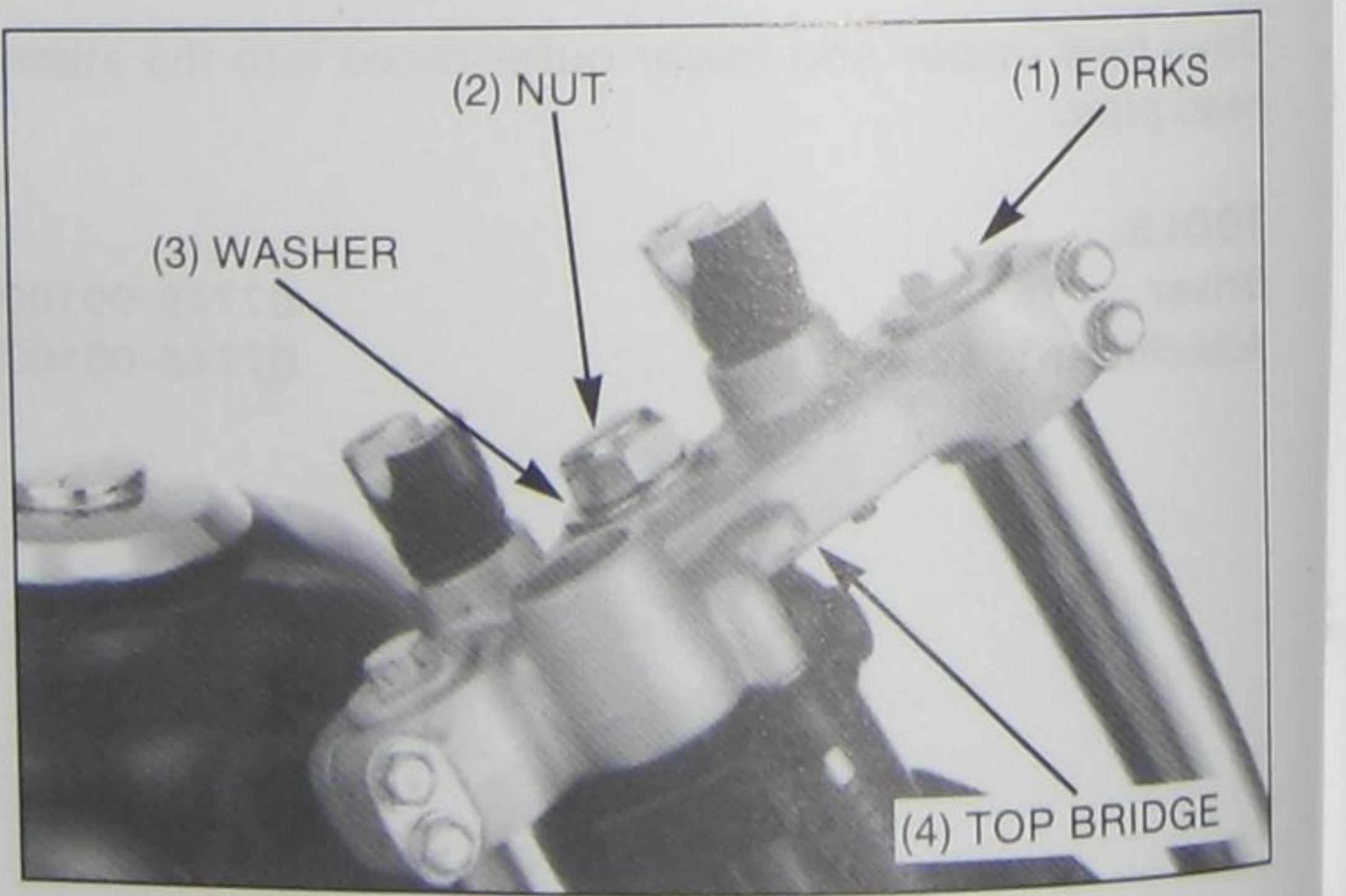
Turn the steering stem right and left, lock-to-lock at least five times to seat the bearings.
Retighten the steering stem adjustment nut to the same torque.



Install the top bridge, washer and steering stem nut.
Temporarily install the fork legs.
Tighten the stem nut.

**TORQUE: 103 N·m (10.5 kgf-m, 76 lbf-ft)**

Remove the forks.
Make sure that the steering stem moves smoothly without play or binding.

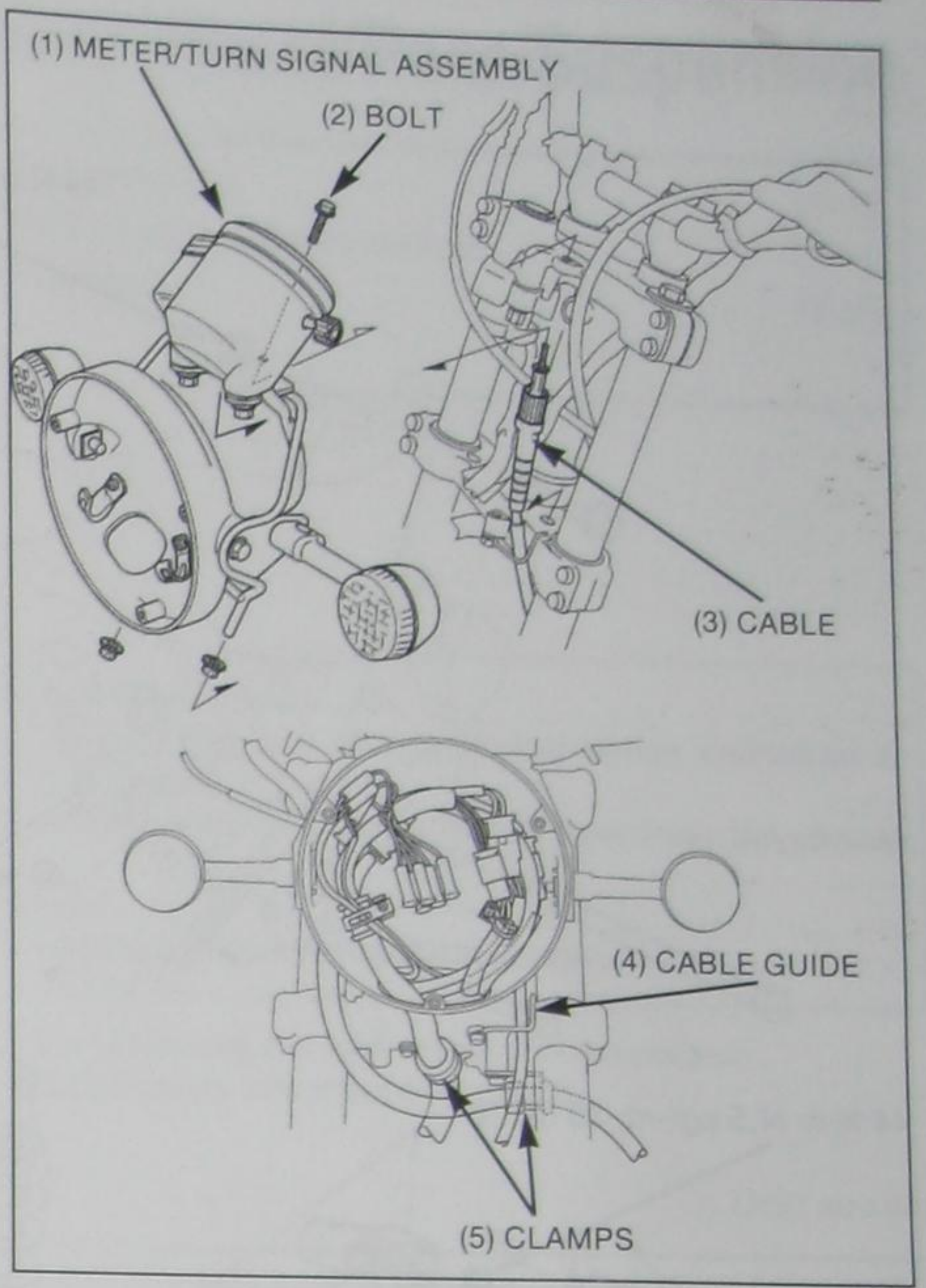


Install the following:
- Left and right forks (page 12-13)
- Handlebar (page 12-15).

Install the wire harness and brake hose clamps onto the bottom bridge and tighten the bolts.
Secure the speedometer cable with the cable guide and tighten the bolt.

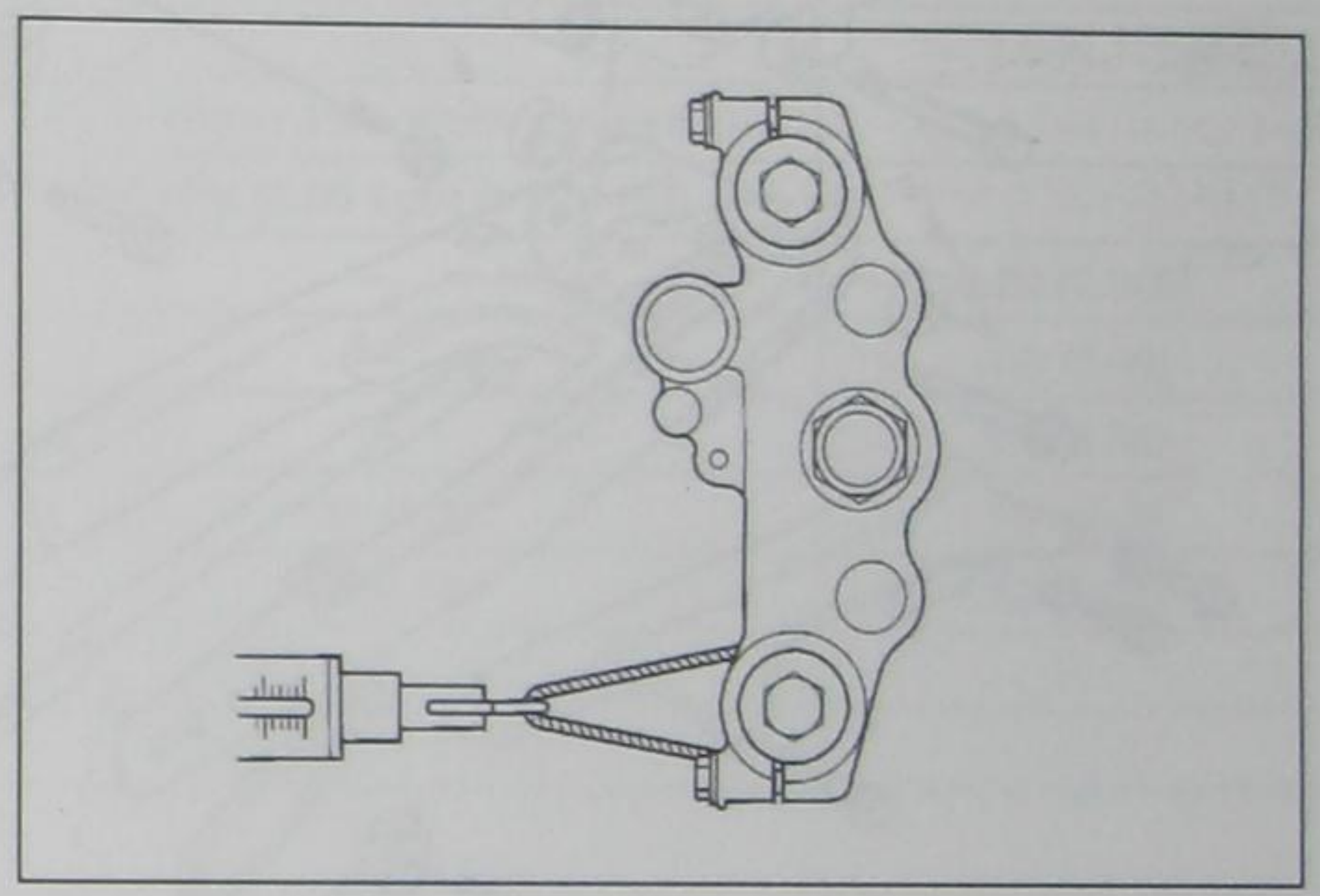
Install the meter/turn signal assembly onto the fork bridges by inserting the wire harnesses through the headlight case and tighten the bolt. Connect the connectors inside the headlight case (page 1-16).
Connect the speedometer cable to the speedometer.

Install the headlight (page 18-2).



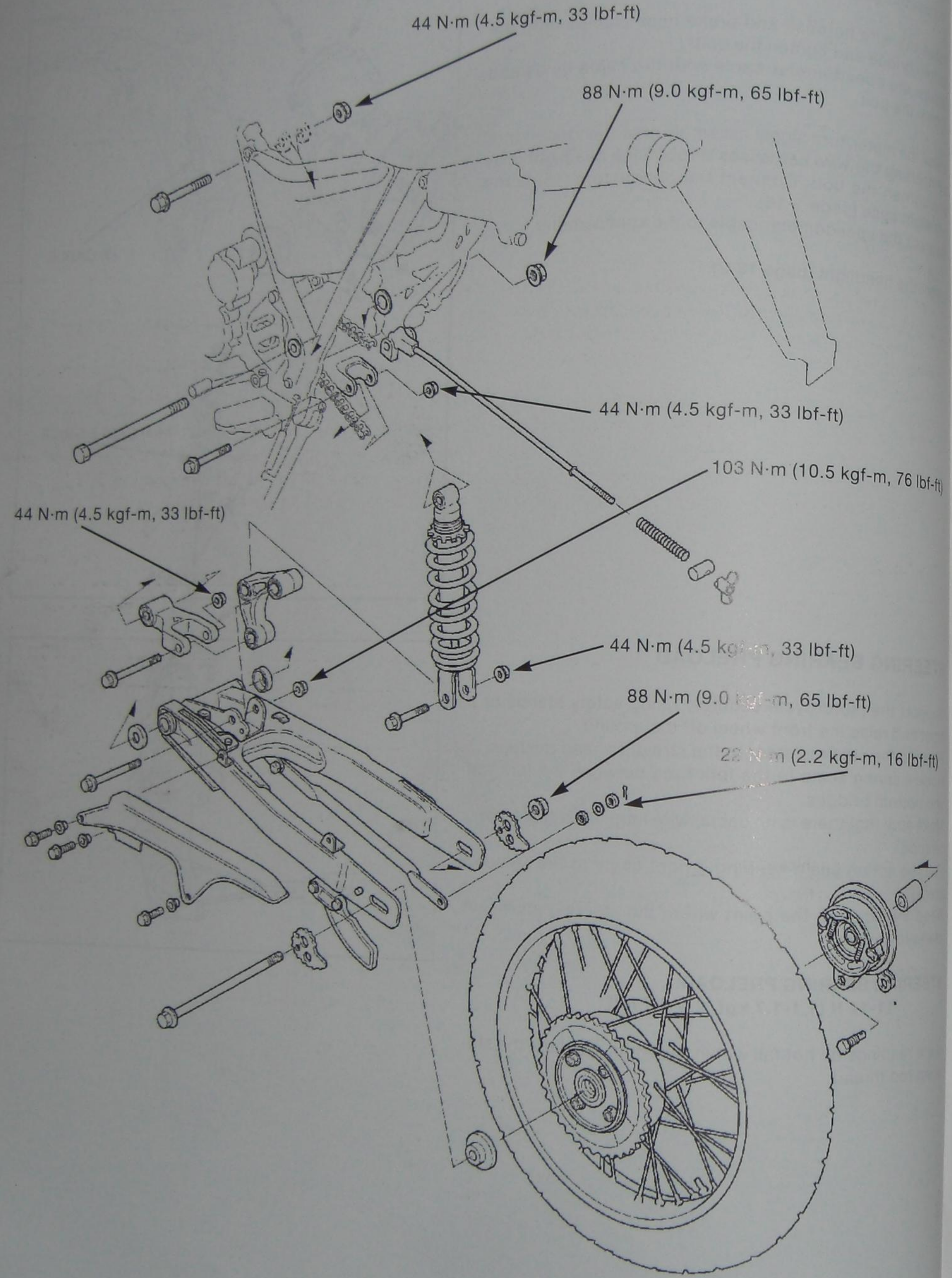
## STEERING BEARING PRELOAD

Support the motorcycle securely using safety stands or a hoist and raise the front wheel off the ground.
Position the steering stem to the straight ahead position.
Hook a spring scale to the fork tube between the fork top and bottom bridges.
Make sure that there is no cable, wire harness or hose interference.
Pull the spring scale keeping it right angle to the steering stem.
Read the scale at the point where the steering stem just starts to move.



**STEERING BEARING PRELOAD:**
**11-17 N (1.1-1.7 kgf, 2.4-3.7 lbf)**

If the readings do not fall within the limits, readjust the steering top thread.


44 N·m (4.5 kgf-m, 33 lbf-ft)
88 N·m (9.0 kgf-m, 65 lbf-ft)
44 N·m (4.5 kgf-m, 33 lbf-ft)
103 N·m (10.5 kgf-m, 76 lbf-ft)
44 N·m (4.5 kgf-m, 33 lbf-ft)
44 N·m (4.5 kgf-m, 33 lbf-ft)
88 N·m (9.0 kgf-m, 65 lbf-ft)
22 N·m (2.2 kgf-m, 16 lbf-ft)

# 13. Rear Wheel/Rear/Suspension

SERVICE INFORMATION 13-1
TROUBLESHOOTING 13-2
REAR WHEEL 13-3
REAR BRAKE 13-7
BRAKE PEDAL 13-10
SHOCK ABSORBER/LINKAGE 13-11
SWINGARM 13-15

## Service Information

### GENERAL

**⚠ WARNING**

- **Riding on damaged rim or spokes impairs safe operation of the vehicle.**
- **A contaminated brake drum or shoe reduces stopping power. Discard contaminated shoes and clean a contaminated drum with a high quality brake degreasing agent.**
- **The shock absorber contains nitrogen gas under high pressure. Do not allow fire or heat near the shock absorber.**
- **Before disposal of the shock absorber, release the nitrogen.**
- **The damper unit is filled with nitrogen gas under high pressure, do not try to disassemble.**

- A hoist or equivalent is required to support the motorcycle when servicing the rear wheel and suspension.
- Use genuine Honda replacement bolts and nuts for all suspension pivots and mounting points.

### SPECIFICATIONS

Unit: mm (in)

| Item | | Standard | Service Limit |
|---|---|---|---|
| Minimum tire tread depth | | — | 3.0 (0.12) |
| Cold tire pressure | Driver only | 175 kPa (1.75 kgf/cm², 25 psi) | — |
| | Driver and passenger | 200 kPa (2.00 kgf/cm², 29 psi) | — |
| Rear axle runout | | — | 0.20 (0.008) |
| Real wheel rim runout | Radial | — | 2.0 (0.08) |
| | Axial | — | 2.0 (0.08) |
| Rear brake drum I.D. | | 130 (5.1) | 131 (5.2) |
| Rear brake lining thickness | | 4.0 (0.16) | 2.0 (0.08) |
| Rear brake pedal free play | | 20-30 (3/4 — 1-1/4) | — |
| Drive chain slack | | 25-35 (1—1-3/8) | — |

### TORQUE VALUES

| | | |
|---|---|---|
| Final driven sprocket nut | 44 N·m (4.5 kgf-m, 33 lbf-ft) | U-nut |
| Rear brake panel stopper arm nut | 22 N·m (2.2 kgf-m, 16 lbf-ft) | |
| Rear axle nut | 88 N·m (9.0 kgf-m, 65 lbf-ft) | U-nut |
| Spoke nipple | 4 N·m (0.4 kgf-m, 2.9 lbf-ft) | |
| Rear brake arm pinch bolt | 10 N·m (1.0 kgf-m, 7 lbf-ft) | |
| Rear shock absorber mounting nut | 44 N·m (4.5 kgf-m, 33 lbf-ft) | U-nut |
| Shock arm-to-swingarm nut | 103 N·m (10.5 kgf-m, 76 lbf-ft) | U-nut |
| Shock link-to-shock arm nut | 44 N·m (4.5 kgf-m, 33 lbf-ft) | U-nut |
| Shock link-to-frame nut | 44 N·m (4.5 kgf-m, 33 lbf-ft) | U-nut |
| Swingarm pivot nut | 88 N·m (9.0 kgf-m, 65 lbf-ft) | U-nut |

13

**TOOLS**

| | |
|---|---|
| Bearing remover shaft | 07746-0050100 |
| Bearing remover head, 15 mm | 07746-0050400 |
| Driver | 07749-0010000 |
| Attachment, 22 x 24 mm | 07746-0010800 |
| Attachment, 32 x 35 mm | 07746-0010100 |
| Attachment, 42 x 47 mm | 07746-0010300 |
| Pilot, 15 mm | 07746-0040300 |
| Pilot, 17 mm | 07746-0040400 |
| Driver shaft | 07946-MJ00100 |
| Driver head | 07946-MJ00200 |
| Bushing driver | 07HMF-MM90200 |
| Spoke wrench C, 5.8 x 6.1 mm | 07701-0020300 |

## Troubleshooting

**Soft suspension**
- Weak shock absorber spring
- Oil leakage from damper unit
- Insufficient tire pressure
- Incorrect suspension adjustment

**Hard suspension**
- Damaged rear suspension pivot bearings
- Bent damper rod
- Tire pressure too high
- Incorrect suspension adjustment

**Rear wheel wobbling**
- Bent rim
- Worn or damaged rear wheel bearings
- Loose or broken spokes
- Faulty rear tire
- Unbalanced rear tire and wheel
- Wheel installed incorrectly
- Bent frame or swingarm

**Rear wheel turns hard**
- Faulty rear wheel bearings
- Bent rear axle
- Rear brake drag
- Drive chain too tight

**Rear suspension noise**
- Faulty rear shock absorber
- Loose rear suspension fasteners
- Worn rear suspension pivot bearings

**Steers to one side or does not track straight**
- Wheel installed incorrectly
- Bend rear axle
- Bent frame or swingarm

**Poor brake performance**
- Improperly adjusted brake
- Worn brake linings
- Worn brake drum
- Worn brake cam
- Improperly installed brake linings
- Contaminated brake linings
- Contaminated brake drum
- Worn brake shoe at cam contact areas

**Brake squeaks**
- Worn brake linings
- Worn brake drum
- Contaminated brake linings
- Contaminated brake drum

## Rear Wheel

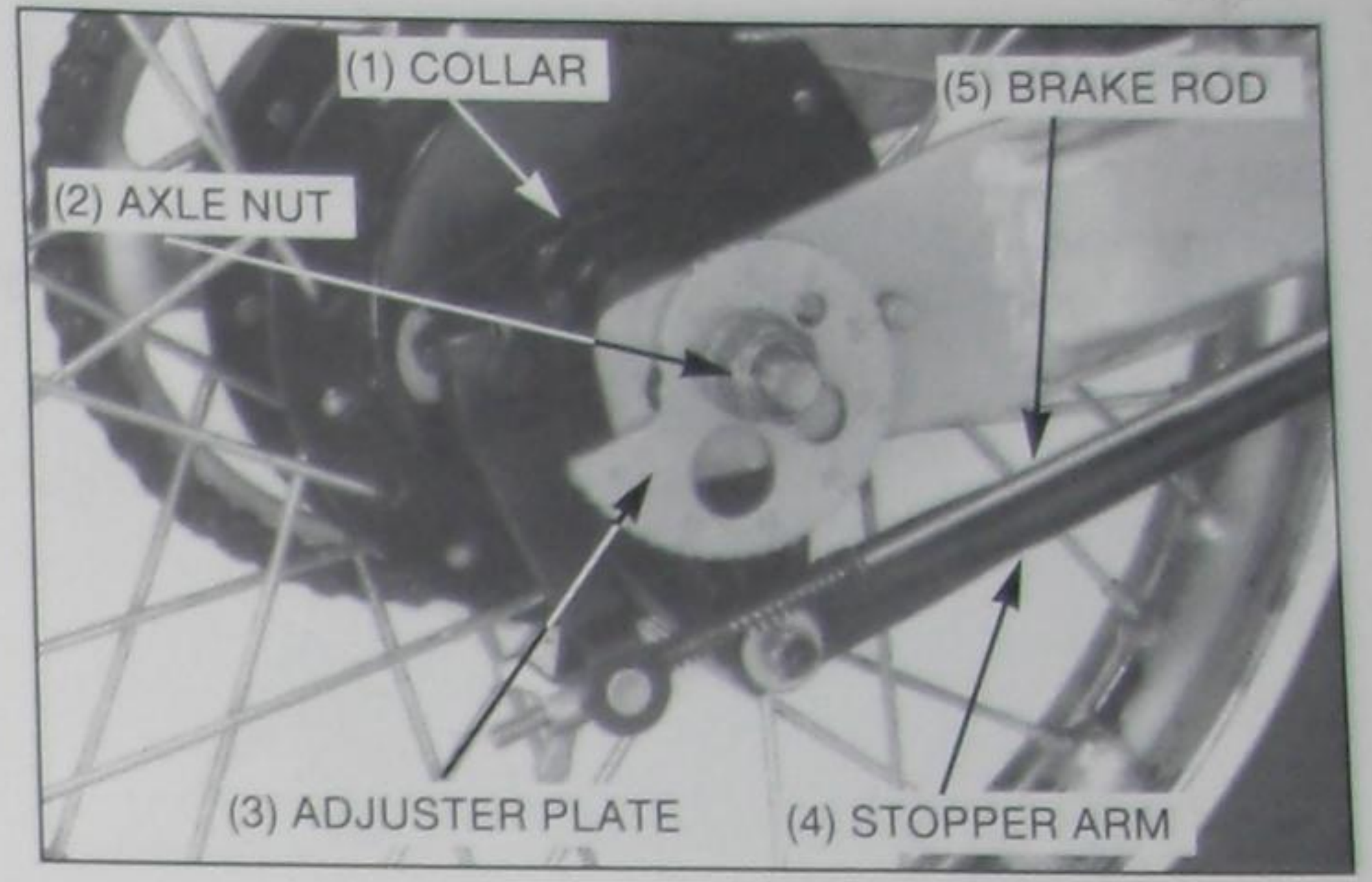
### REMOVAL

Loosen the rear axle nut.

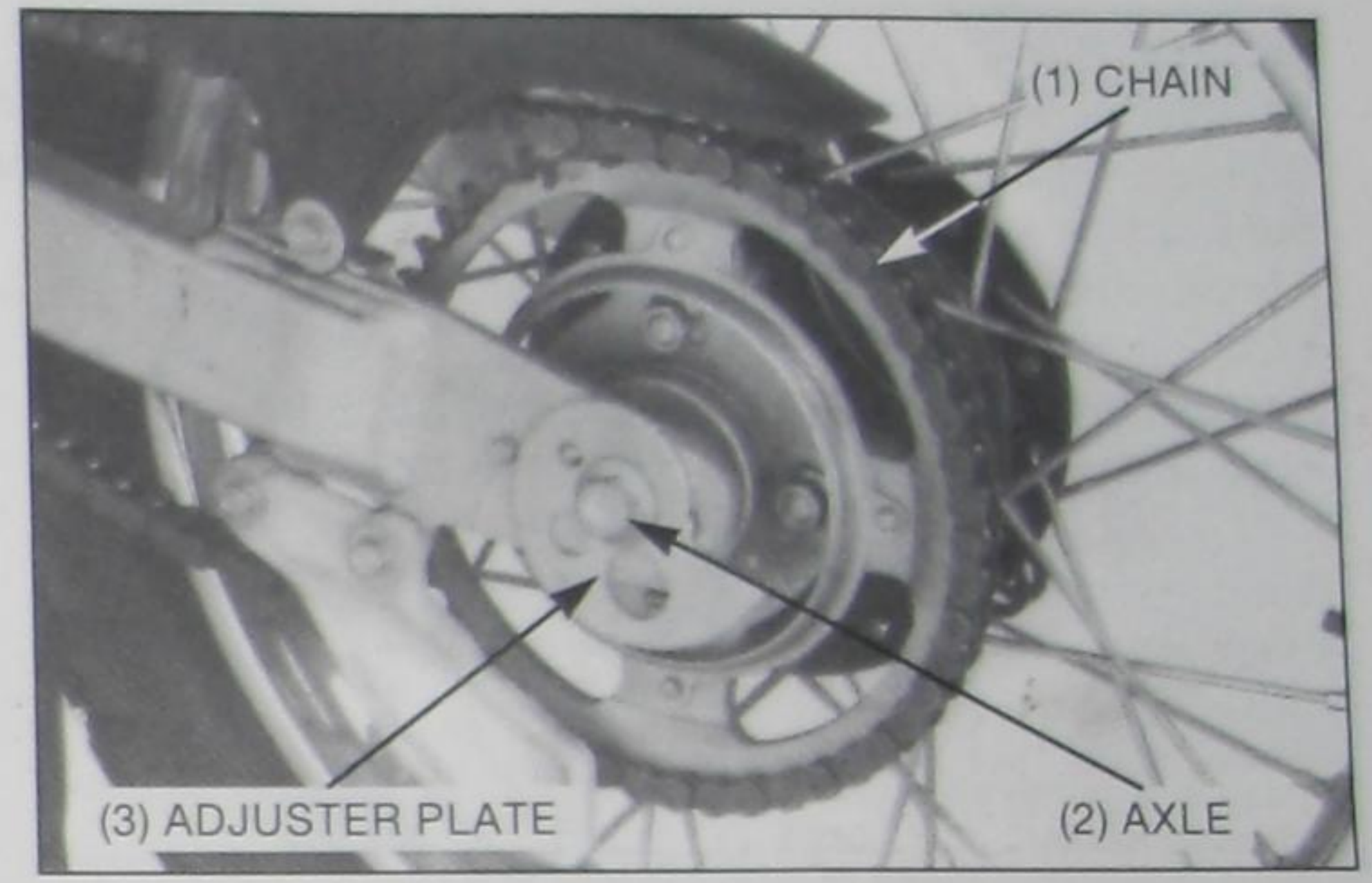
Raise the rear wheel off the ground and support the motorcycle securely with a hoist or equivalent.

Disconnect the brake stopper arm by removing the following:
- Cotter pin
- Nut
- Washer
- Seat rubber
- Bolt.

Remove the adjusting nut and disconnect the brake rod from the brake arm.
Remove the joint pin and spring.

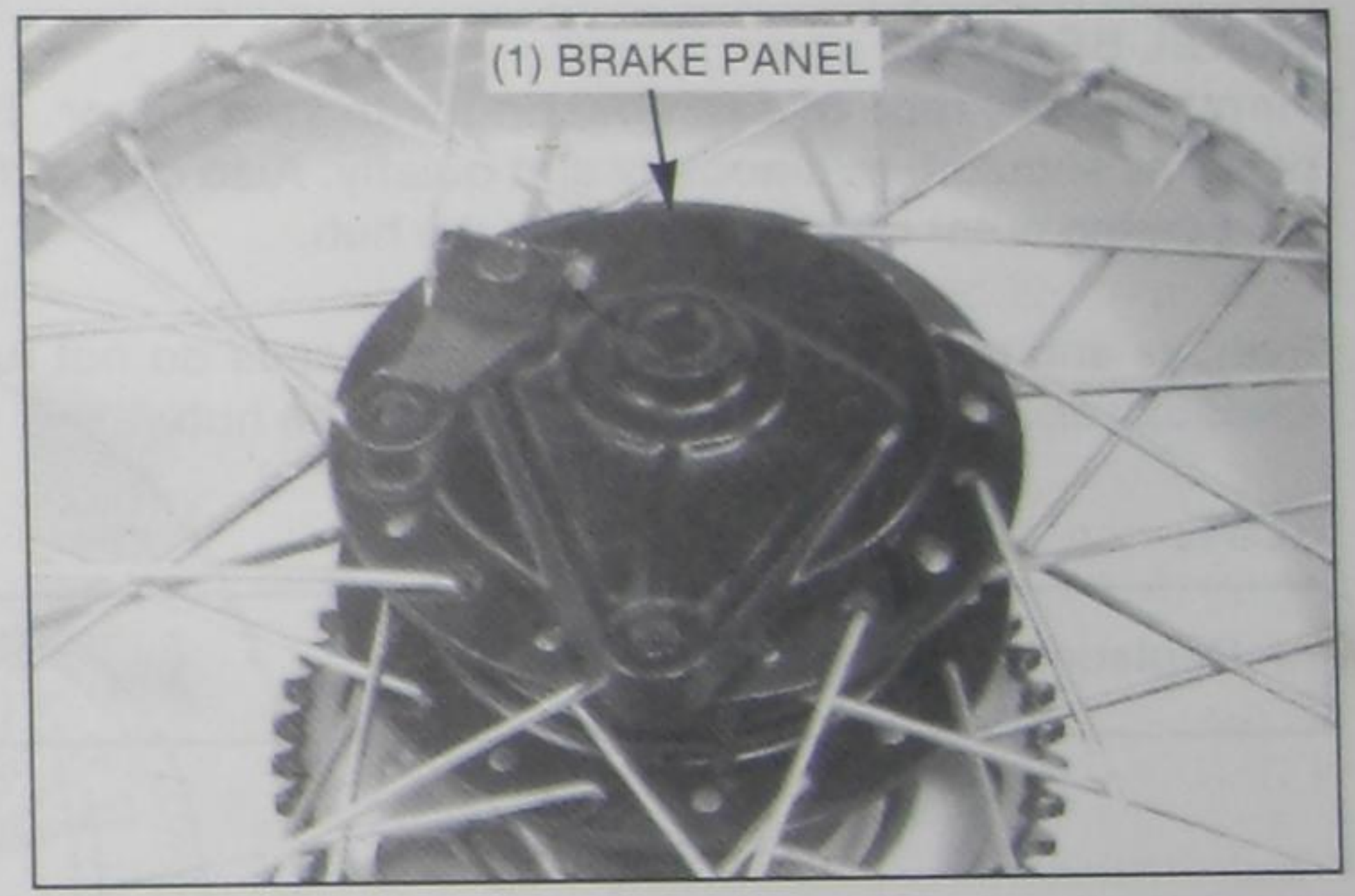


Remove the rear axle nut, washer and right adjuster plate. Move the rear wheel forward for maximum drive chain slack and remove the drive chain from the final driven sprocket. Pull the axle out, then remove the right side collar and the rear wheel.

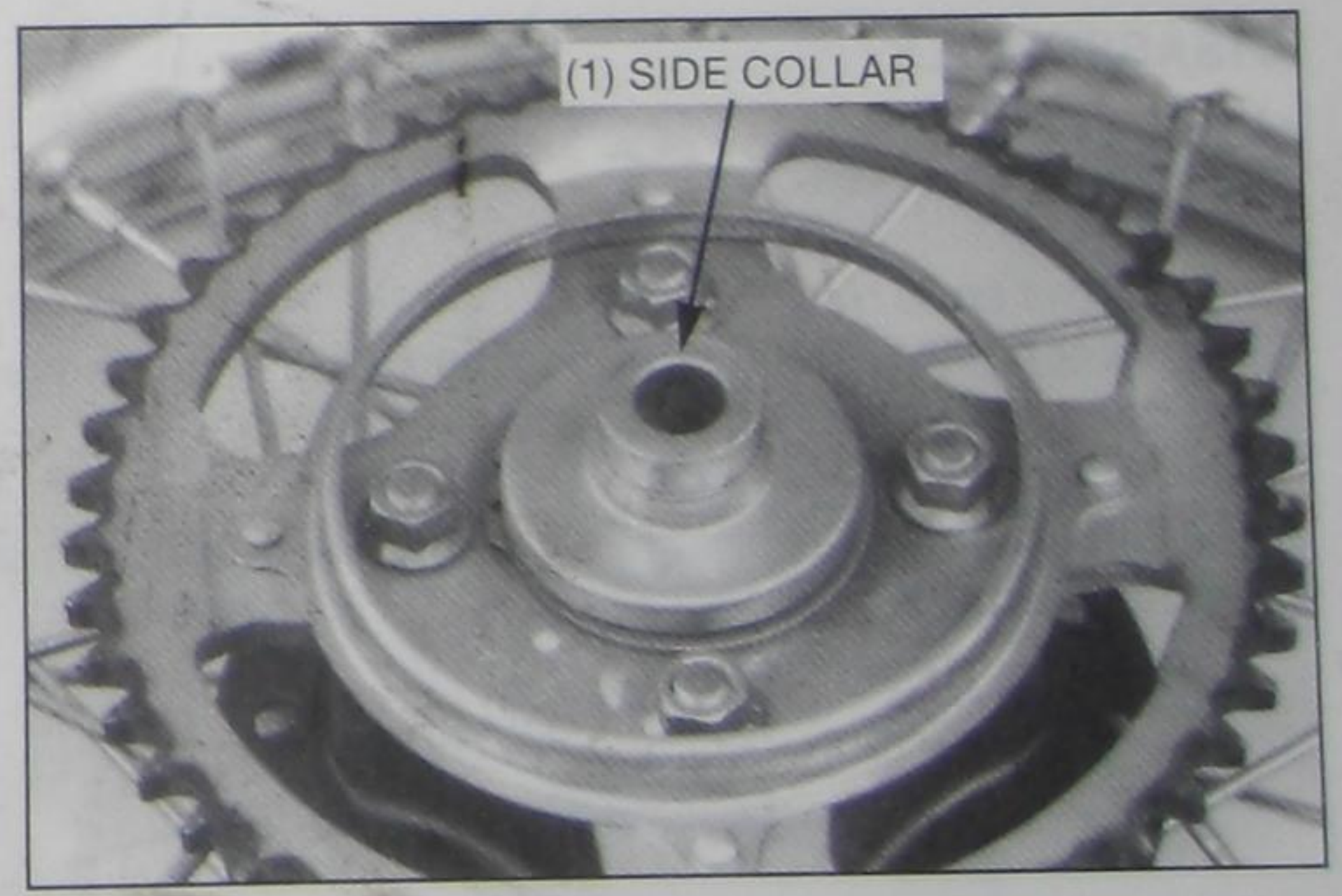


Remove the brake panel from the wheel hub.

For rear brake service, refer to page 13-7.



Remove the left side collar.

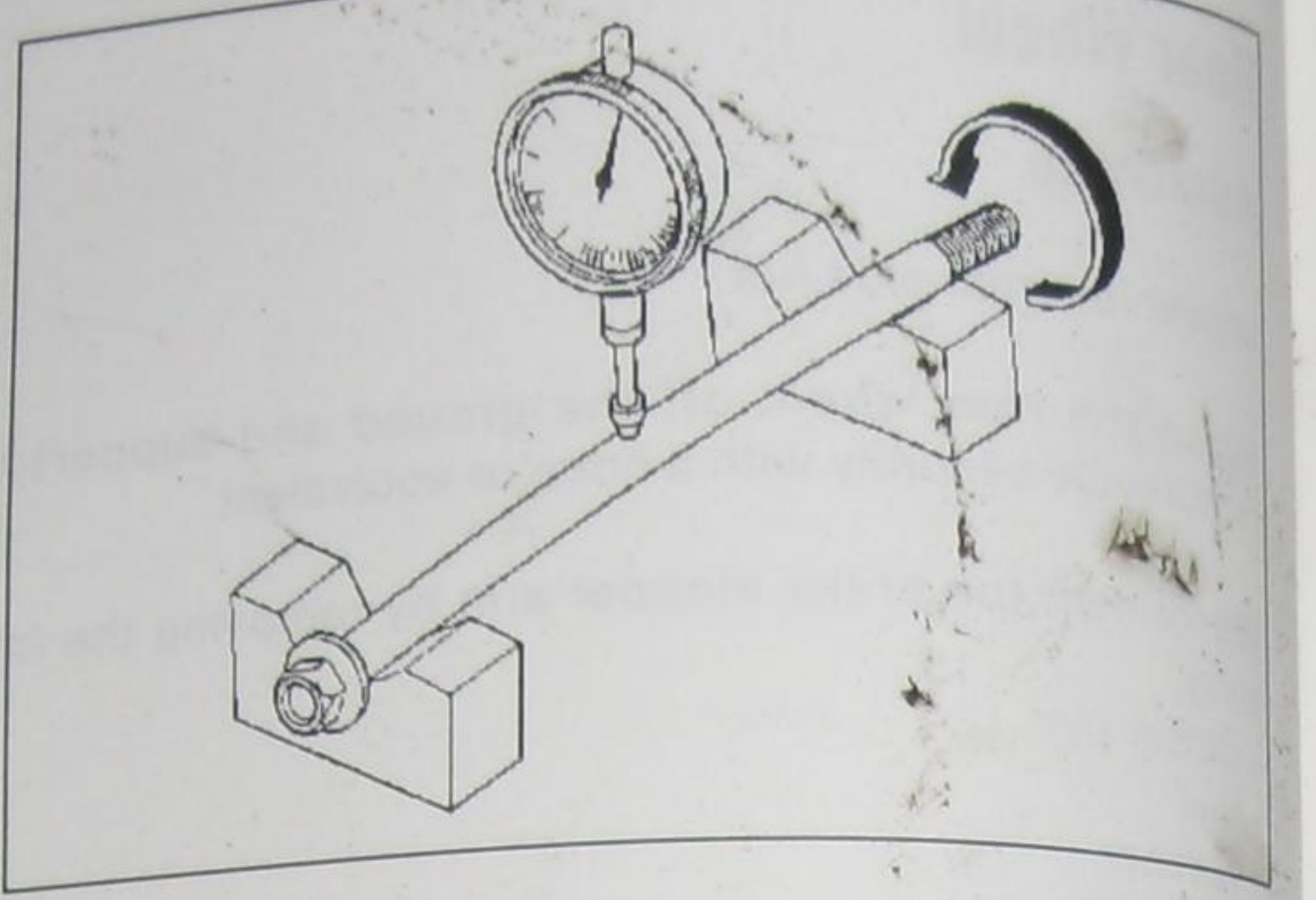


## INSPECTION

**AXLE**

Set the front axle in V-blocks.
Turn the front axle and measure the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

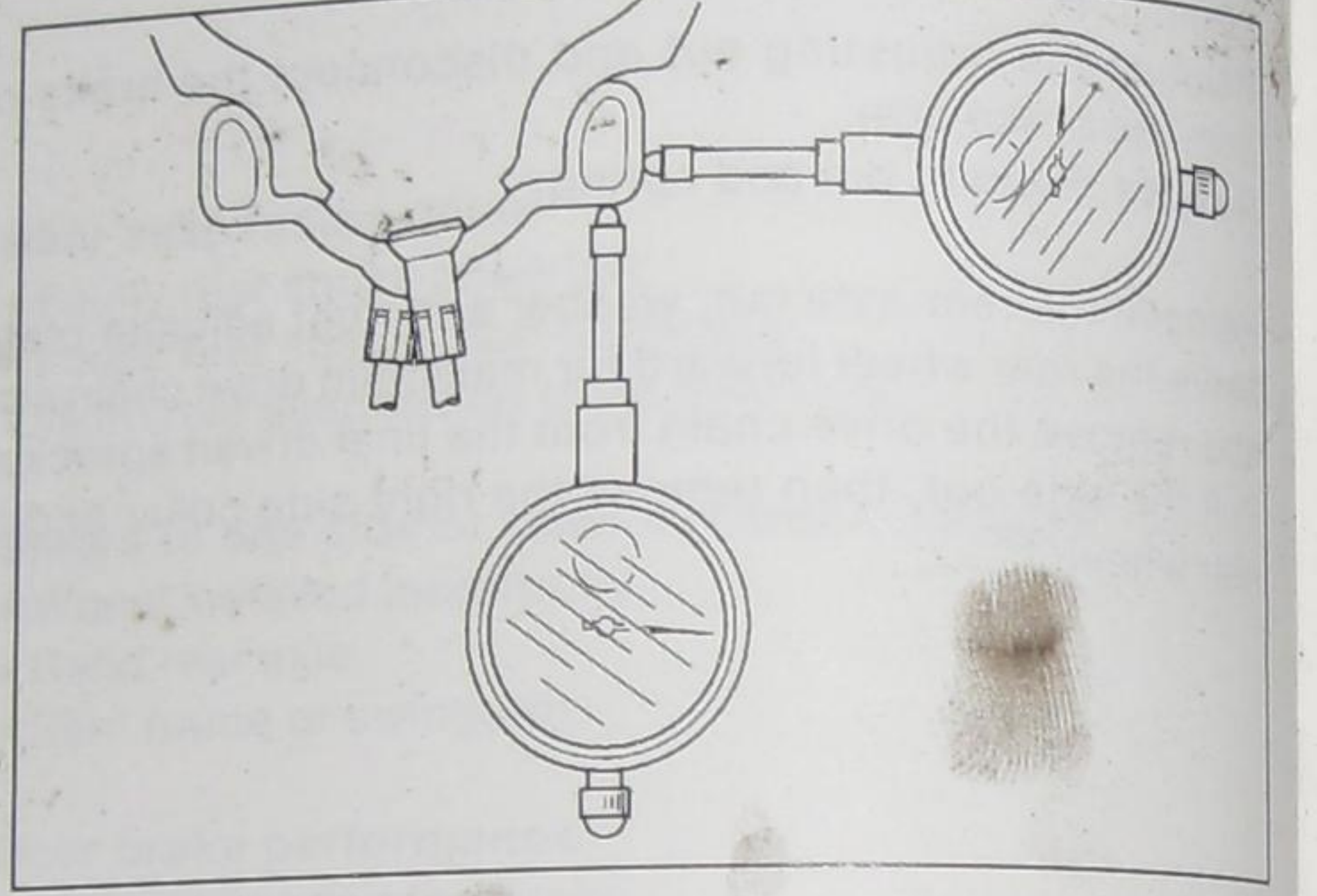
**SERVICE LIMIT: 0.20 mm (0.008 in)**



**WHEEL RIM**

Check the rim runout by placing the wheel in a truing stand.
Spin the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

**SERVICE LIMITS:** **Radial: 2.0 mm (0.08 in)**
**Axial: 2.0 mm (0.08 in)**



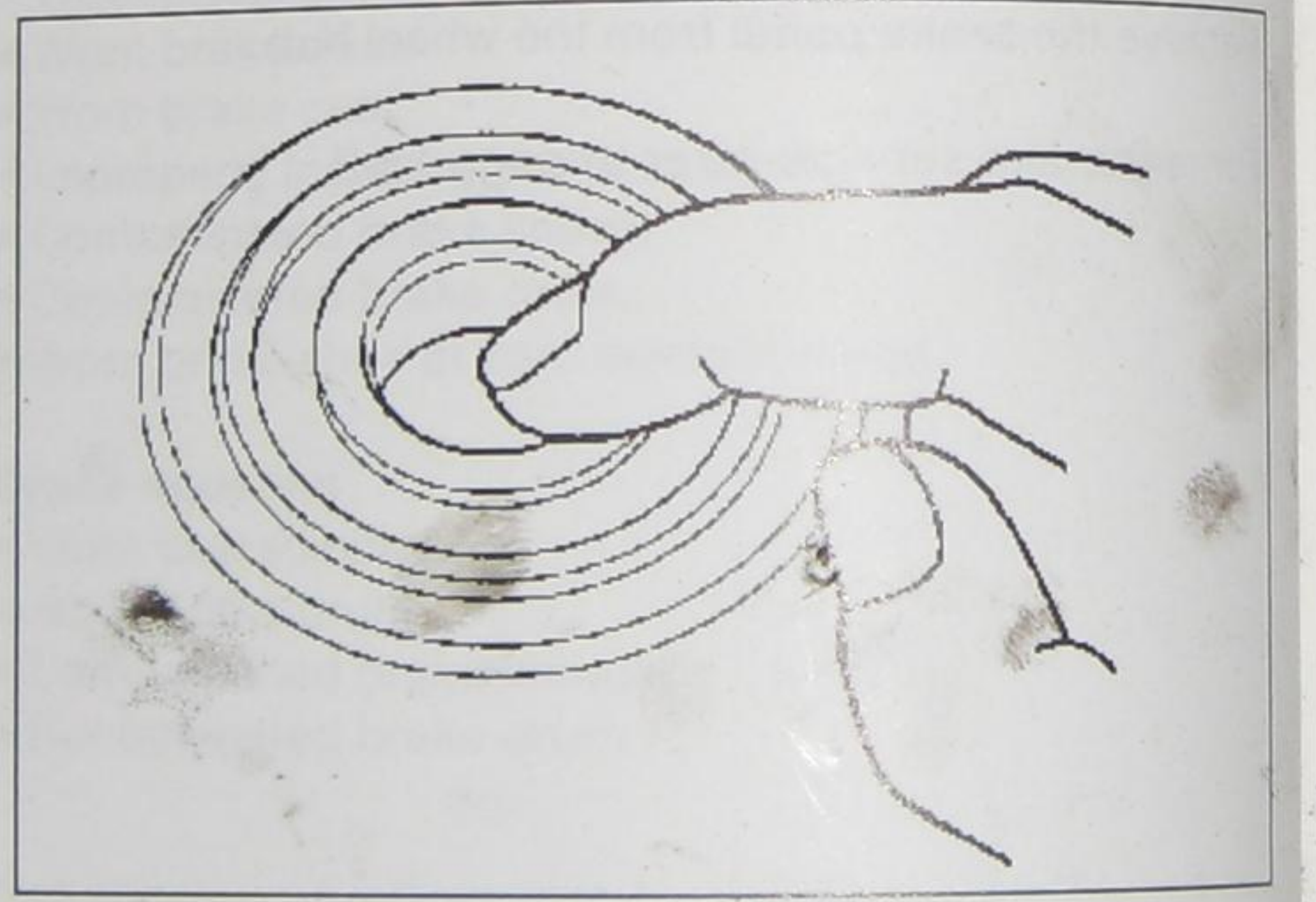
**WHEEL BEARING**

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if the races do not turn smoothly and quietly, if they fit loosely in the hub.

NOTE:

- Replace the wheel bearings in pairs.

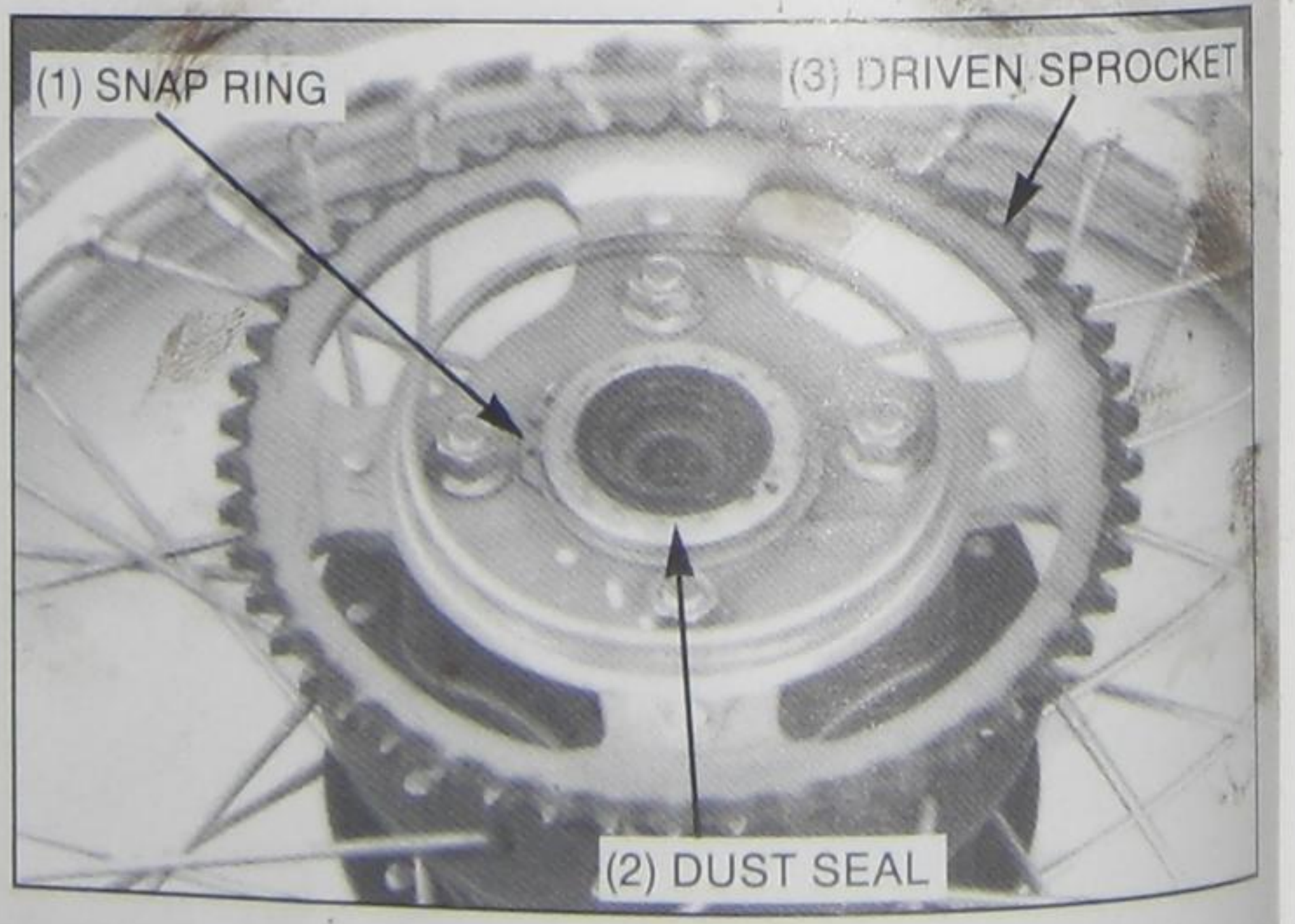


## DISASSEMBLY

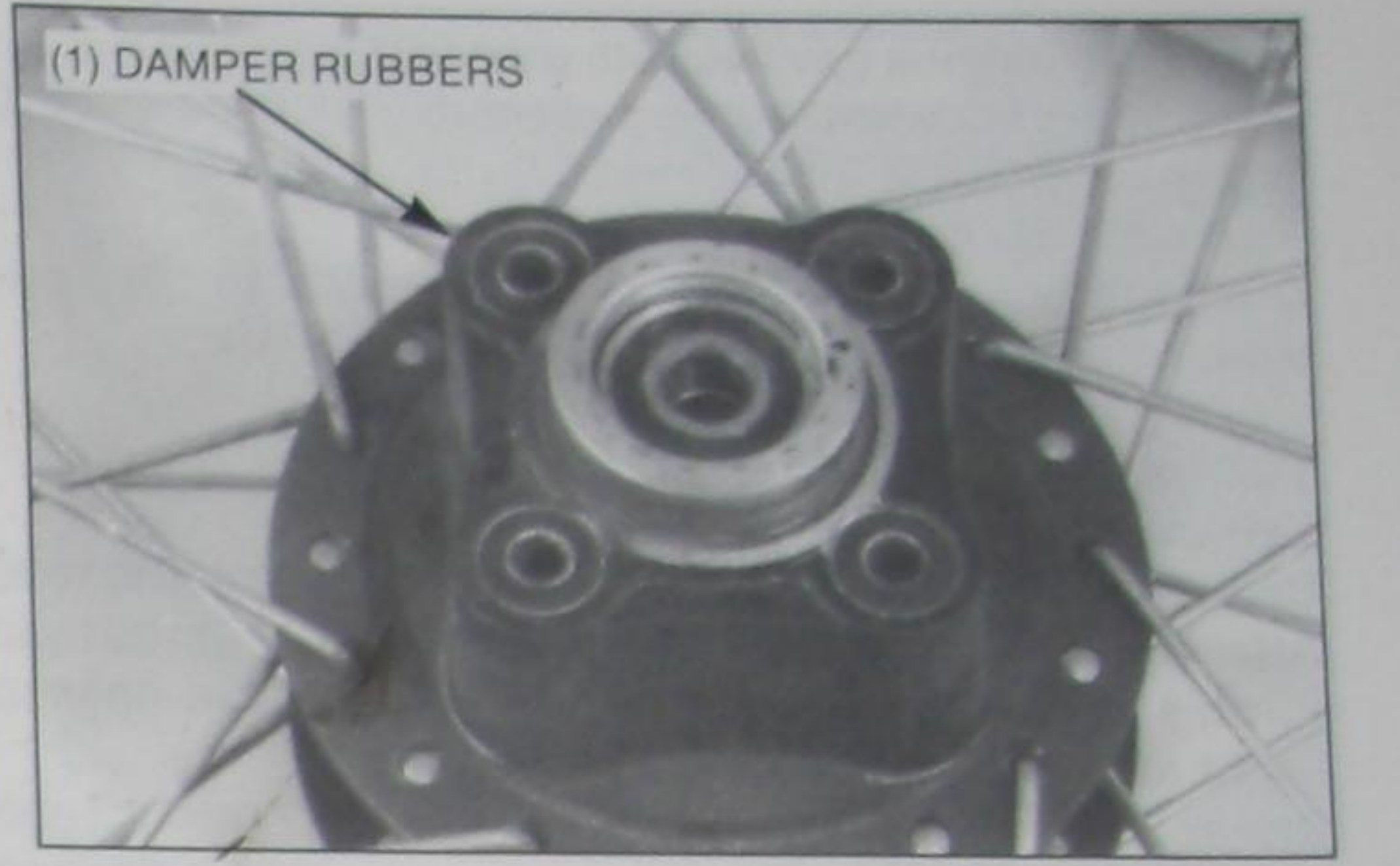
Remove the dust seal.

Remove the snap ring.
Remove the final driven sprocket by tapping it in several locations with a piece of wood or a soft hammer.

If the final driven sprocket requires replacement, remove the nuts and bolt.


(1) SNAP RING
(3) DRIVEN SPROCKET
(2) DUST SEAL

Check the damper rubbers for deterioration or damage.
Replace the wheel hub if necessary.


(1) DAMPER RUBBERS

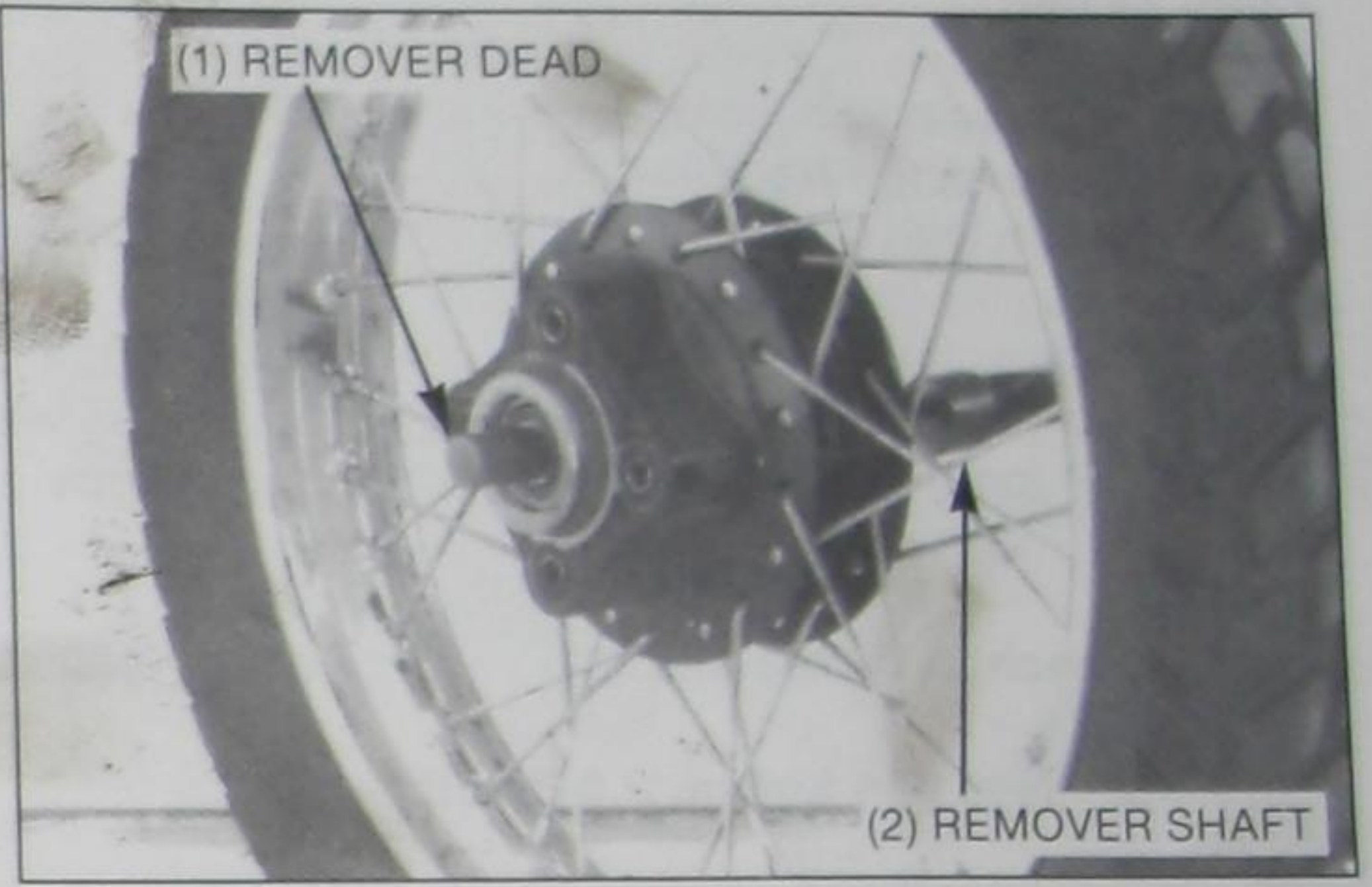
Install the bearing remover head into the bearing.
From opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

**TOOLS:**

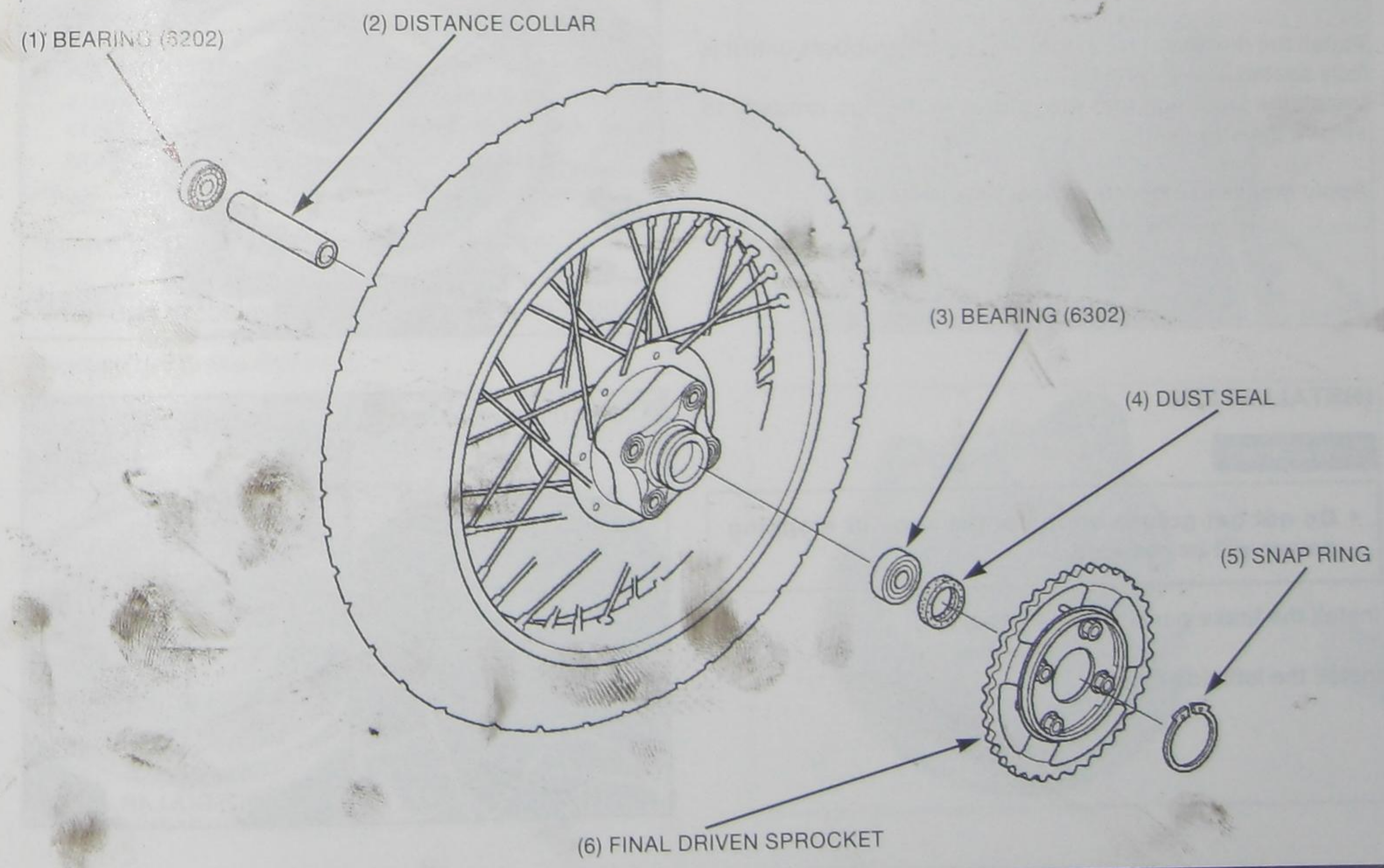
| | |
|---|---|
| **Bearing remover shaft** | **07746-0050100** |
| **Bearing remover head, 15 mm** | **07746-0050400** |

NOTE:

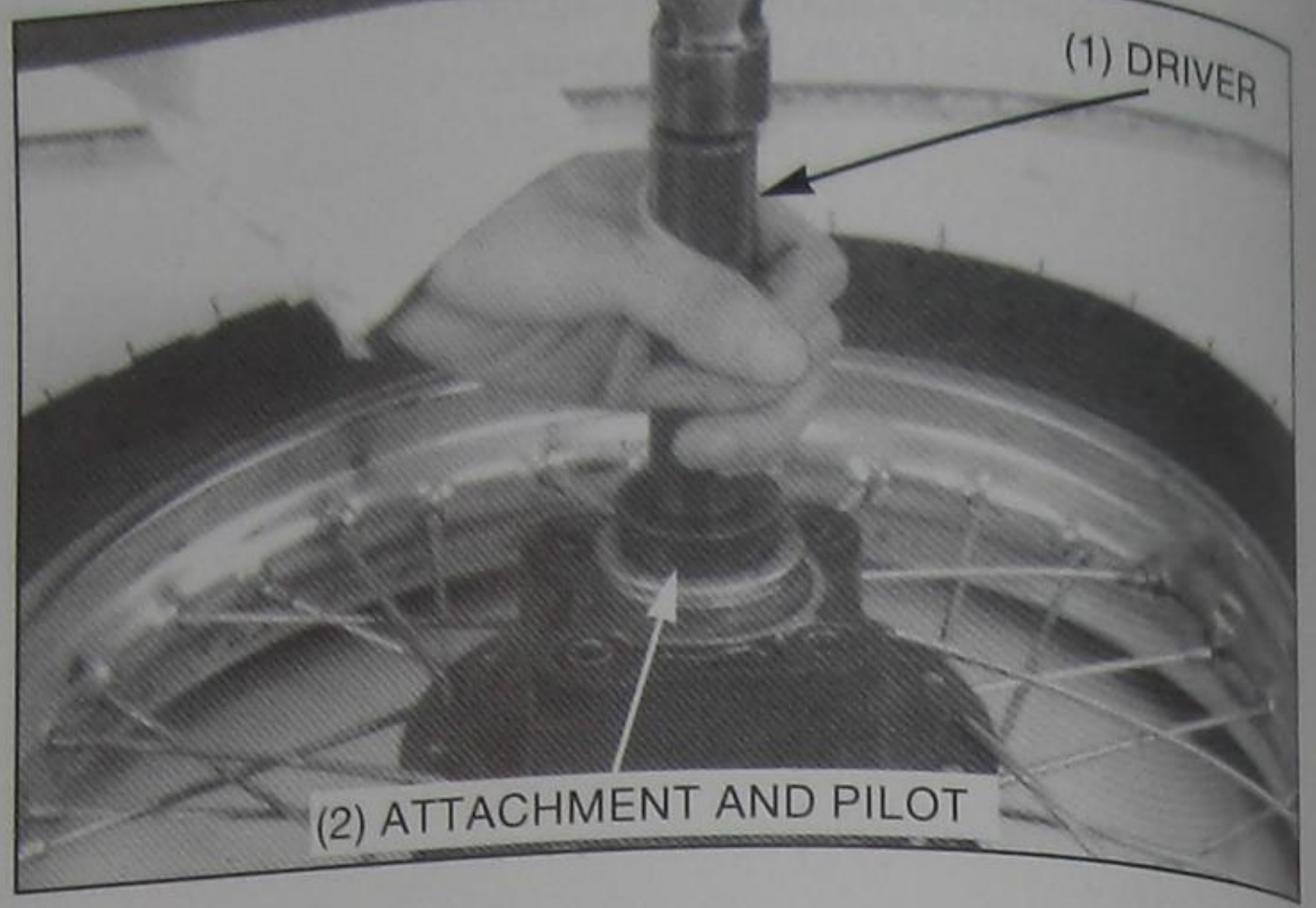
- Replace the wheel bearings in pairs. Do not reuse old bearings.


(1) REMOVER DEAD
(2) REMOVER SHAFT

## ASSEMBLY


(1) BEARING (6202)
(2) DISTANCE COLLAR
(3) BEARING (6302)
(4) DUST SEAL
(5) SNAP RING
(6) FINAL DRIVEN SPROCKET

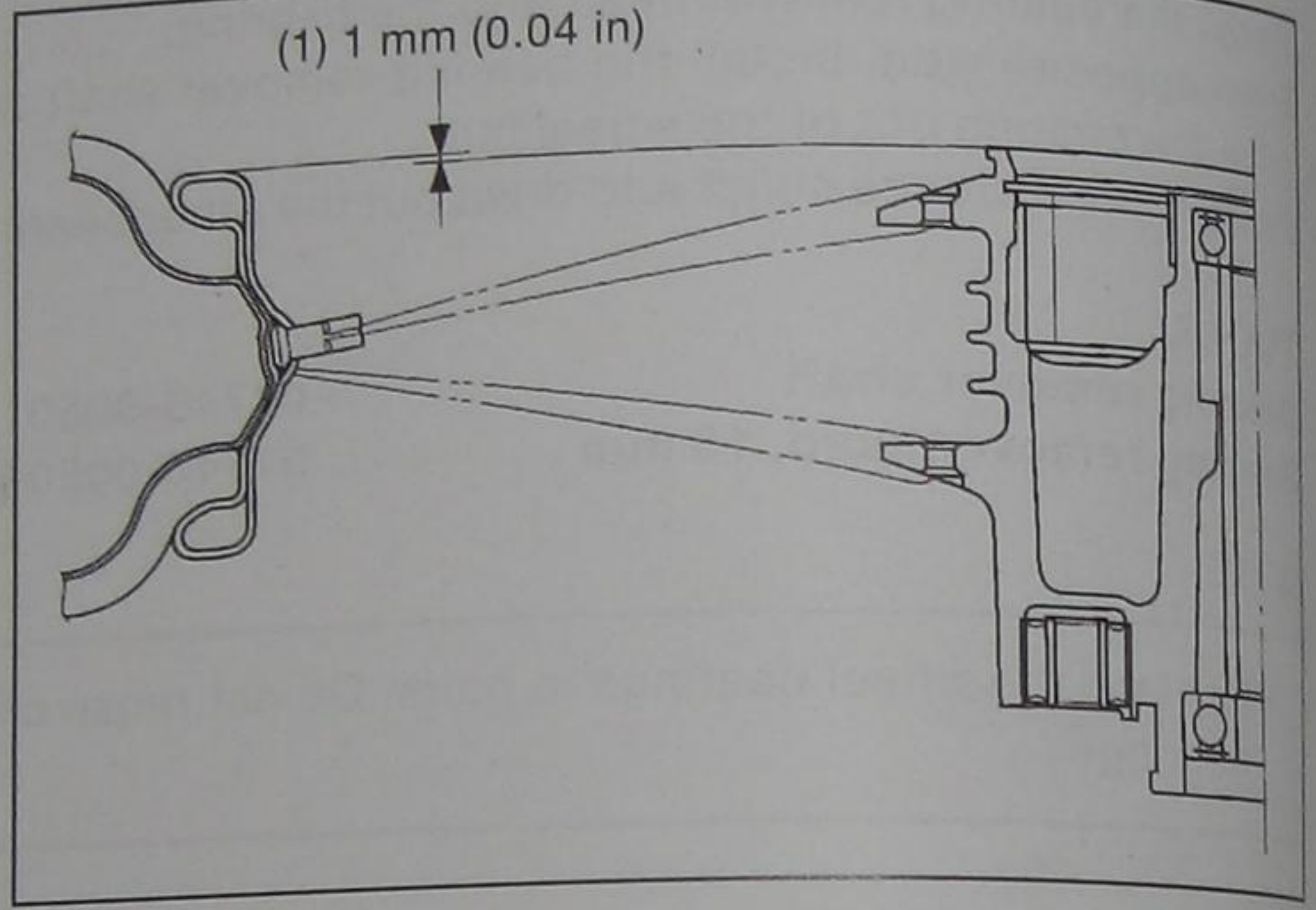
Pack new bearing cavities with grease.
Drive in the left wheel bearing squarely with the sealed side facing up until it is fully seated.
Install the distance collar.
Drive in the right wheel bearing squarely with the sealed side facing up until it is fully seated.



**TOOLS:**

| | |
|---|---|
| **Left side:** | |
| **Driver** | 07749-0010000 |
| **Attachment, 42 x 47 mm** | 07746-0010300 |
| **Pilot, 15 mm** | 07746-0040300 |
| **Right side:** | |
| **Driver** | 07749-0010000 |
| **Attachment, 32 x 35 mm** | 07746-0010100 |
| **Pilot, 15 mm** | 07746-0040300 |

When new spokes are installed, perform as follows:
Place the rim on the work bench.
Place the hub with the left side down and begin lacing with new spokes.
Adjust the hub position so that the distance from the hub right end surface to the rim right side is 1 mm (0.04 in) as shown. Tighten the spokes in 2 or 3 progressive steps.



**TOOL:**

| | |
|---|---|
| **Spoke wrench, 5.8 x 6.1 mm** | 07701-0020300 |

**TORQUE:** 4 N·m (0.4 kgf-m, 2.9 lbf-ft)

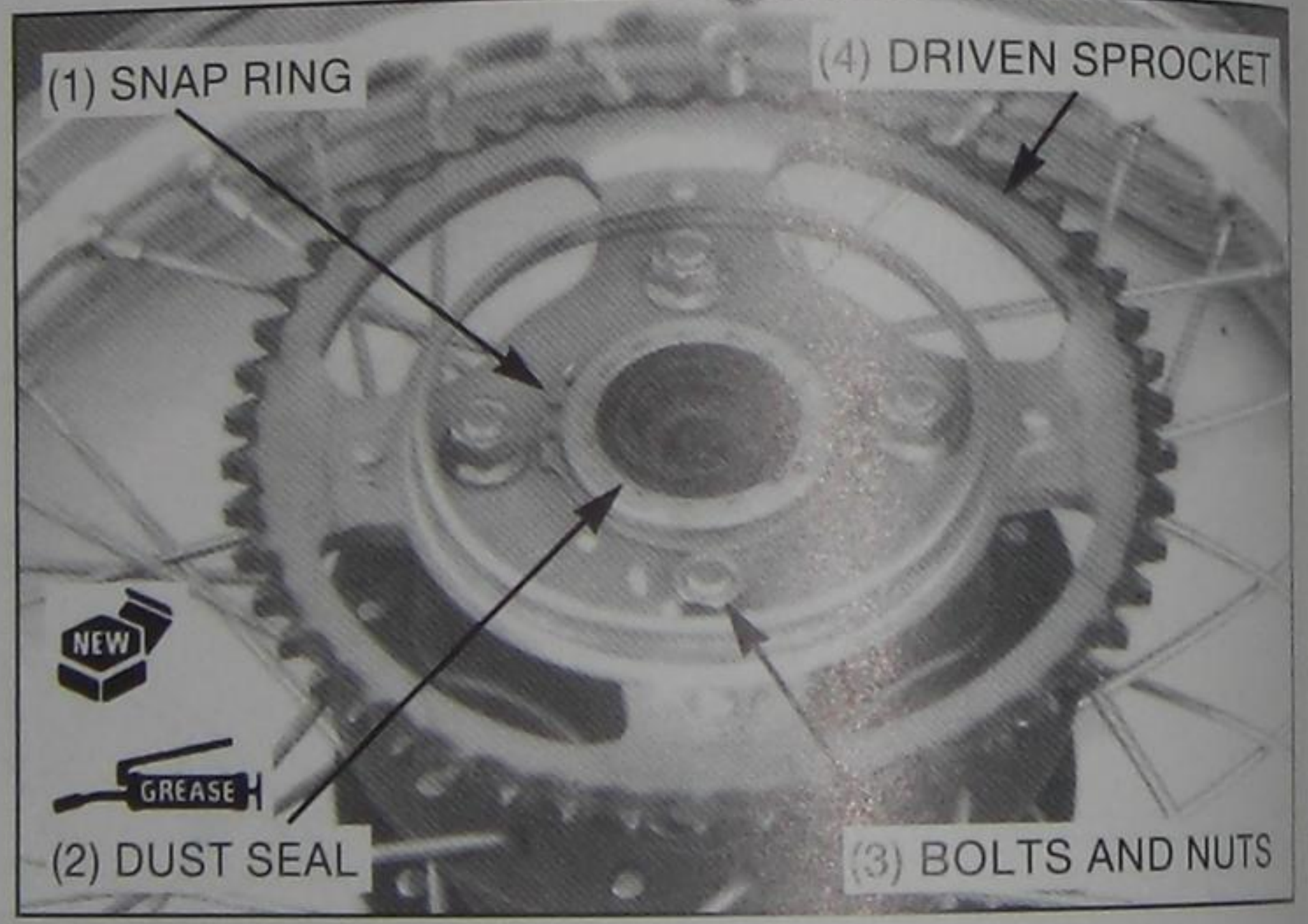
Check the rim runout (page 13-4).

Install the sprocket bolts and nuts and tighten them.

**TORQUE:** 44 N·m (4.5 kgf-m, 33 lbf-ft)

Install the driven sprocket into the damper rubbers until it is fully seated.
Install the snap ring into the groove in the hub properly to secure the sprocket.

Apply grease to a new dust seal lip and install it.



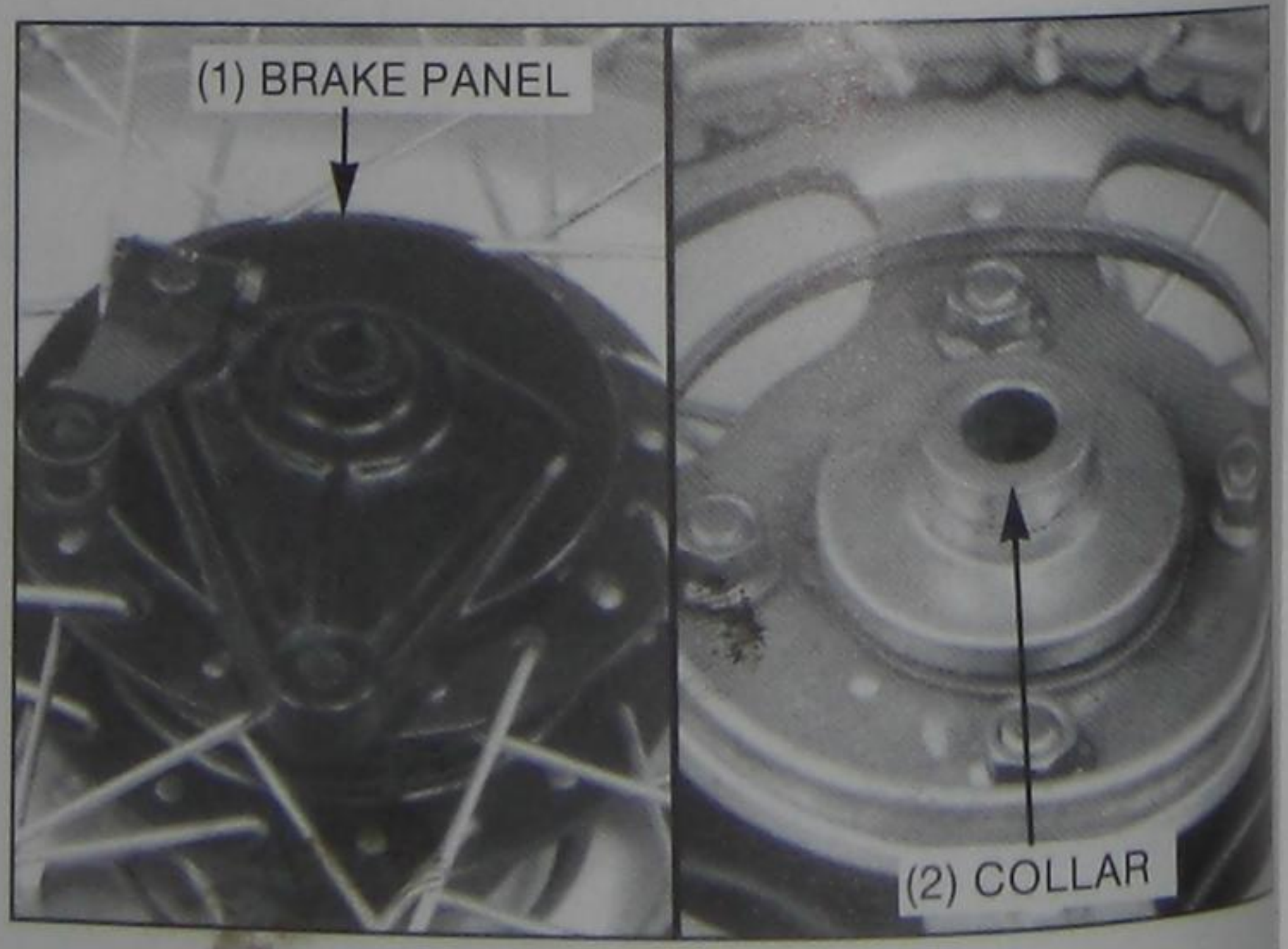
### INSTALLATION

**⚠ WARNING**

- **Do not get grease on the brake shoe or stopping power will be reduced.**

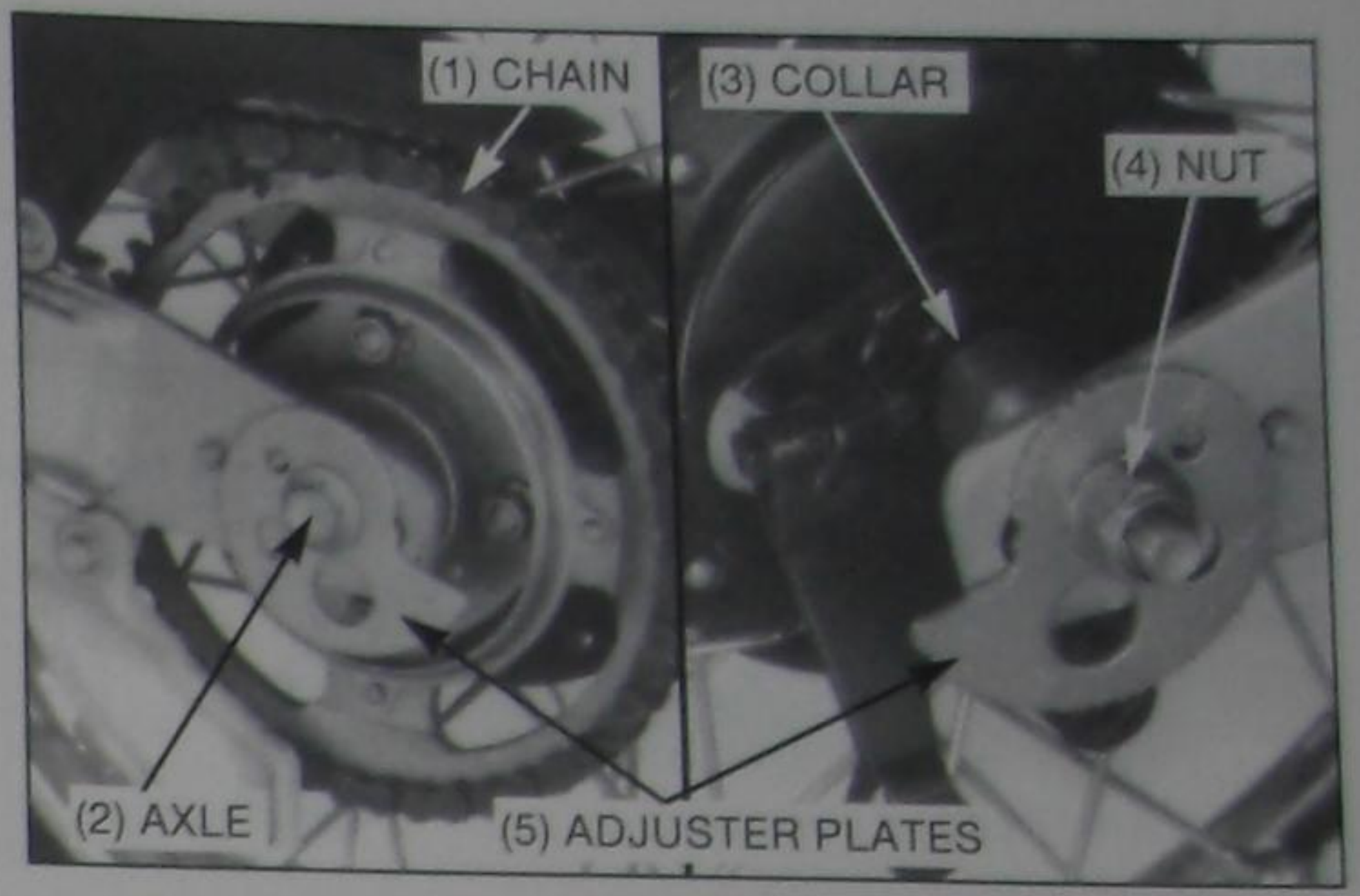
Install the brake panel into the wheel hub.

Install the left side collar.



Place the rear wheel between the swingarm legs and install the drive chain onto the final driven sprocket.
Insert the axle with the left adjuster plate from the left side, then install the right side collar.

Install the right adjuster plate and axle nut but do not tighten it.



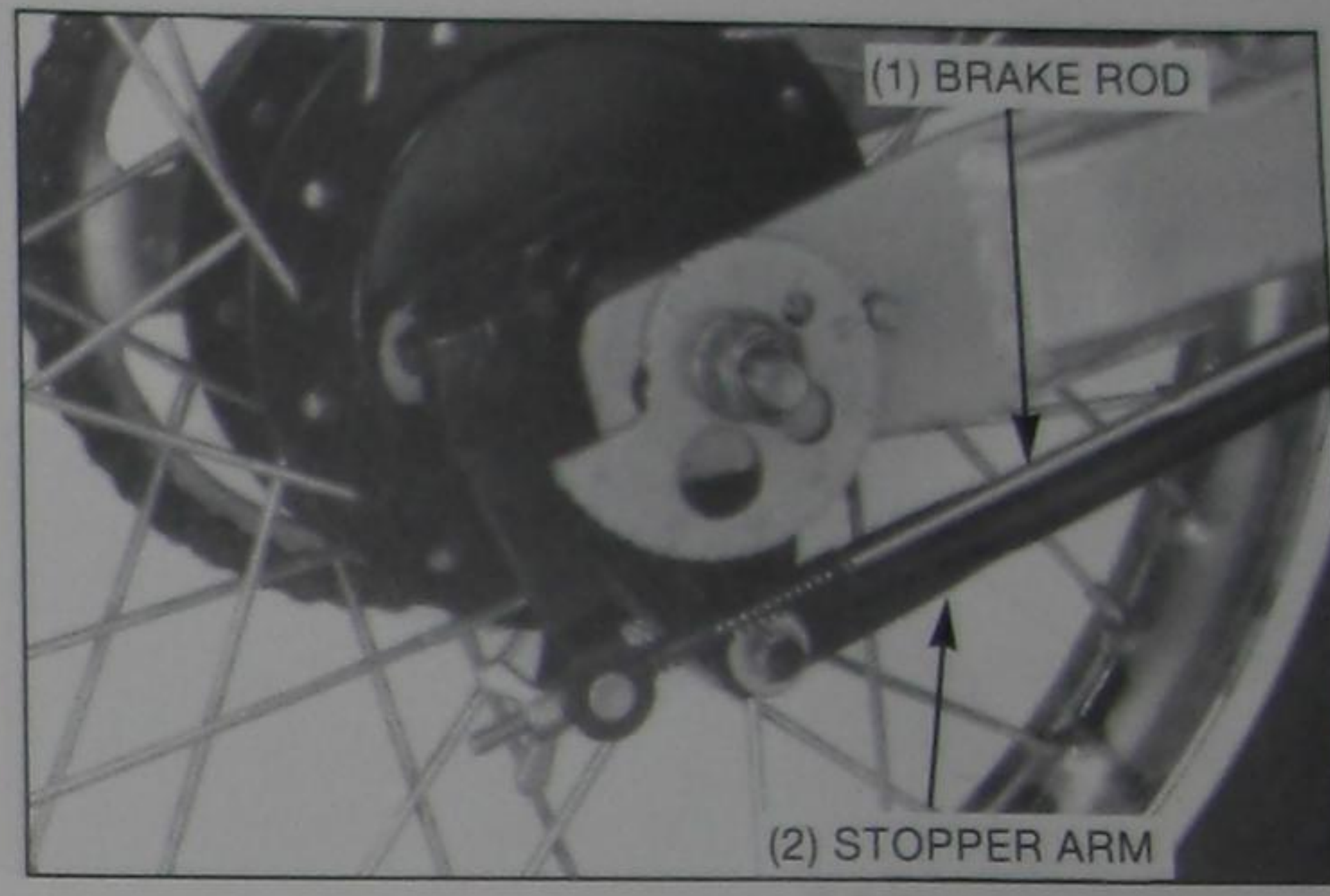
Connect the stopper arm to the brake panel with the stopper bolt. Install the seat rubber, washer and nut and tighten it.

**TORQUE:** 22 N·m (2.2 kgf-m, 16 lbf-ft)

Install a new cotter pin into the stopper bolt.

Install the spring onto the brake rod and the joint pin into the brake arm. Connect the brake rod to the brake arm and install the adjusting nut.

Adjust the following:
- Drive chain (page 3-10)
- Brake pedal free play (pare 3-12).



## Rear Brake

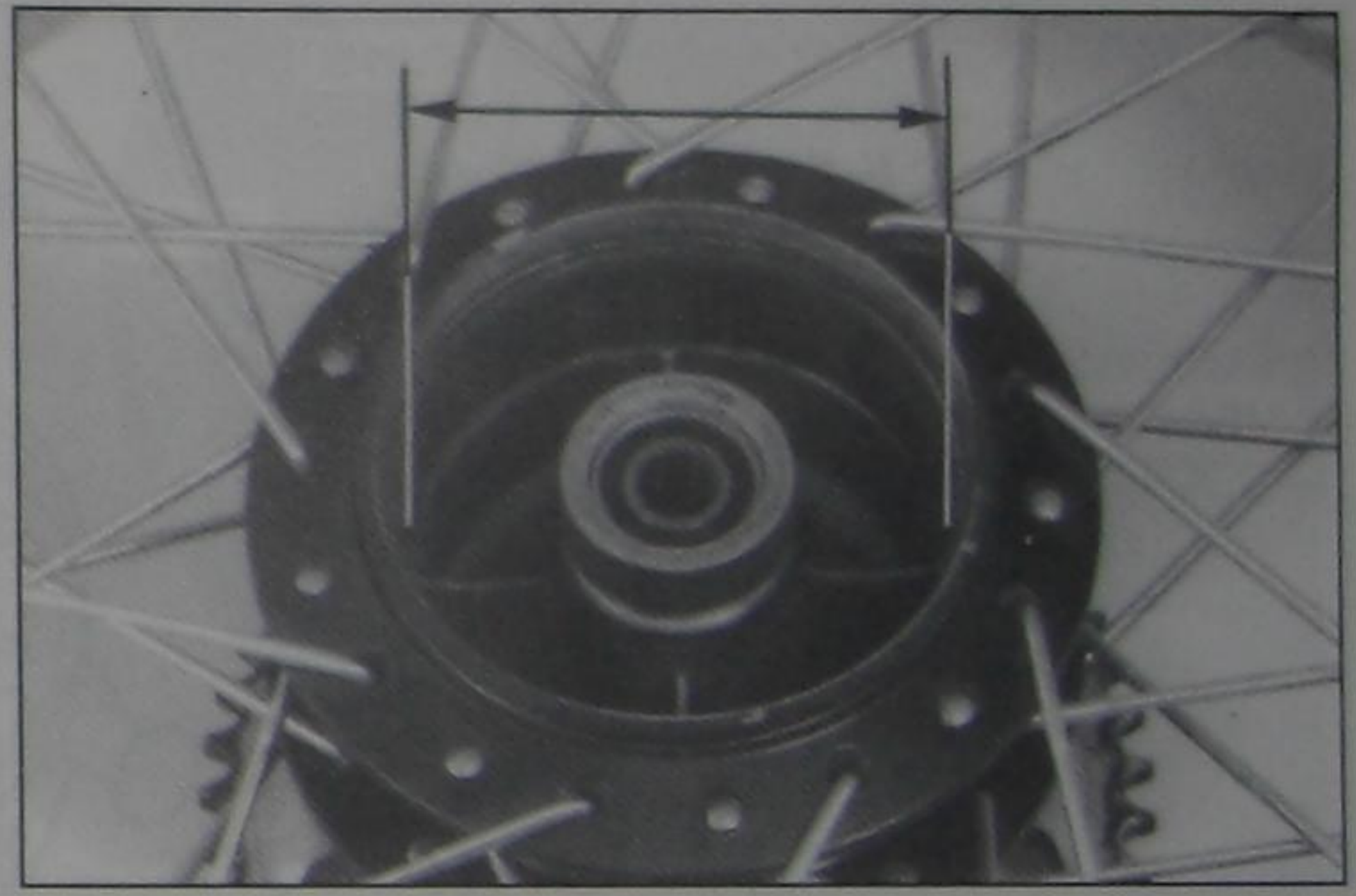
**⚠ WARNING**

- **A contaminated brake drum or shoe reduces stopping power. Discard contaminated shoes and clean a contaminated drum with a high quality brake degreasing agent.**

Remove the brake panel from the wheel (page 13-3).

### INSPECTION

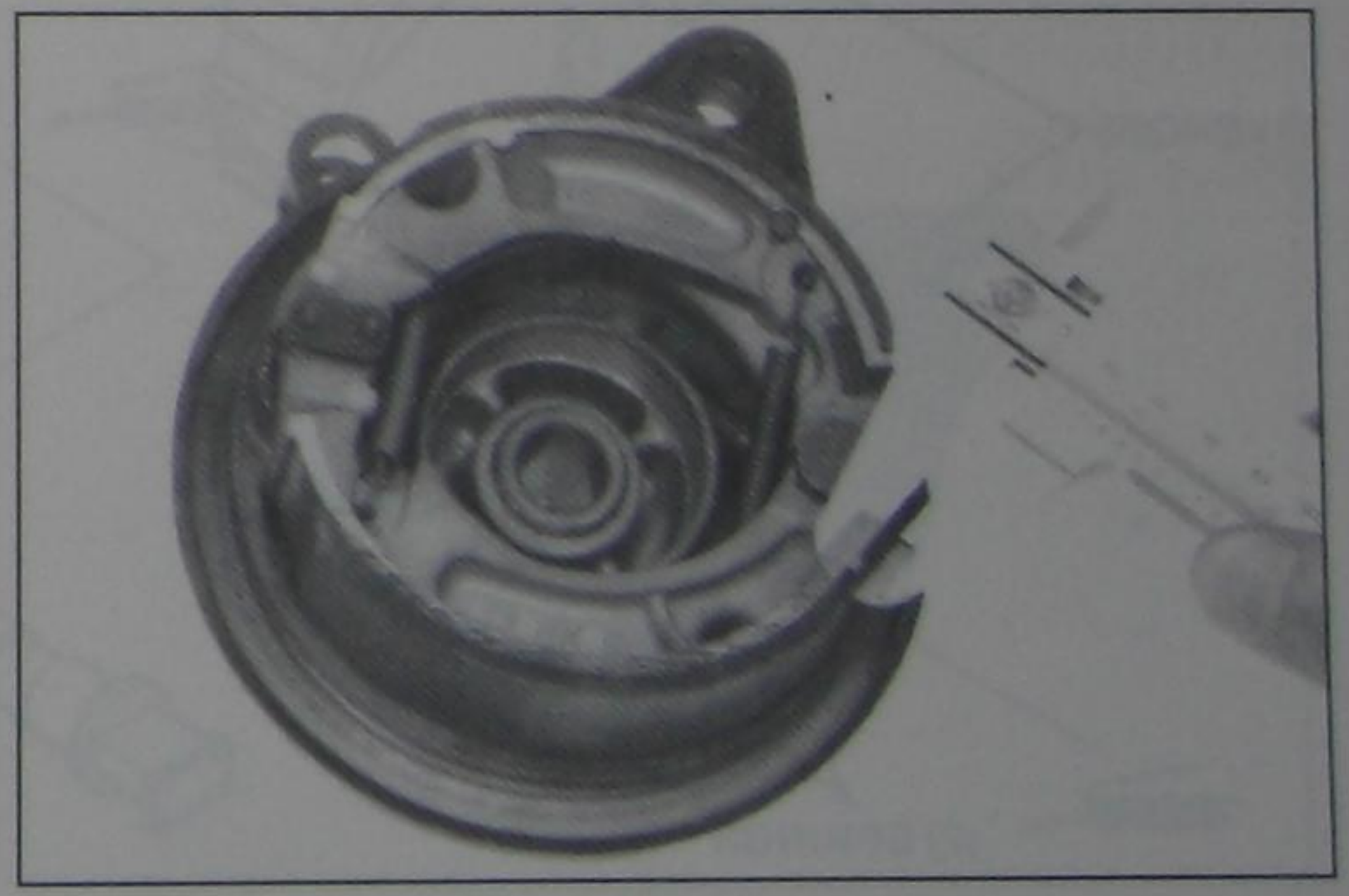
Measure the brake drum I.D.



**SERVICE LIMIT:** 131 mm (5.2 in)

Measure the brake lining thickness.

**SERVICE LIMIT:** 2.0 mm (0.08 in)

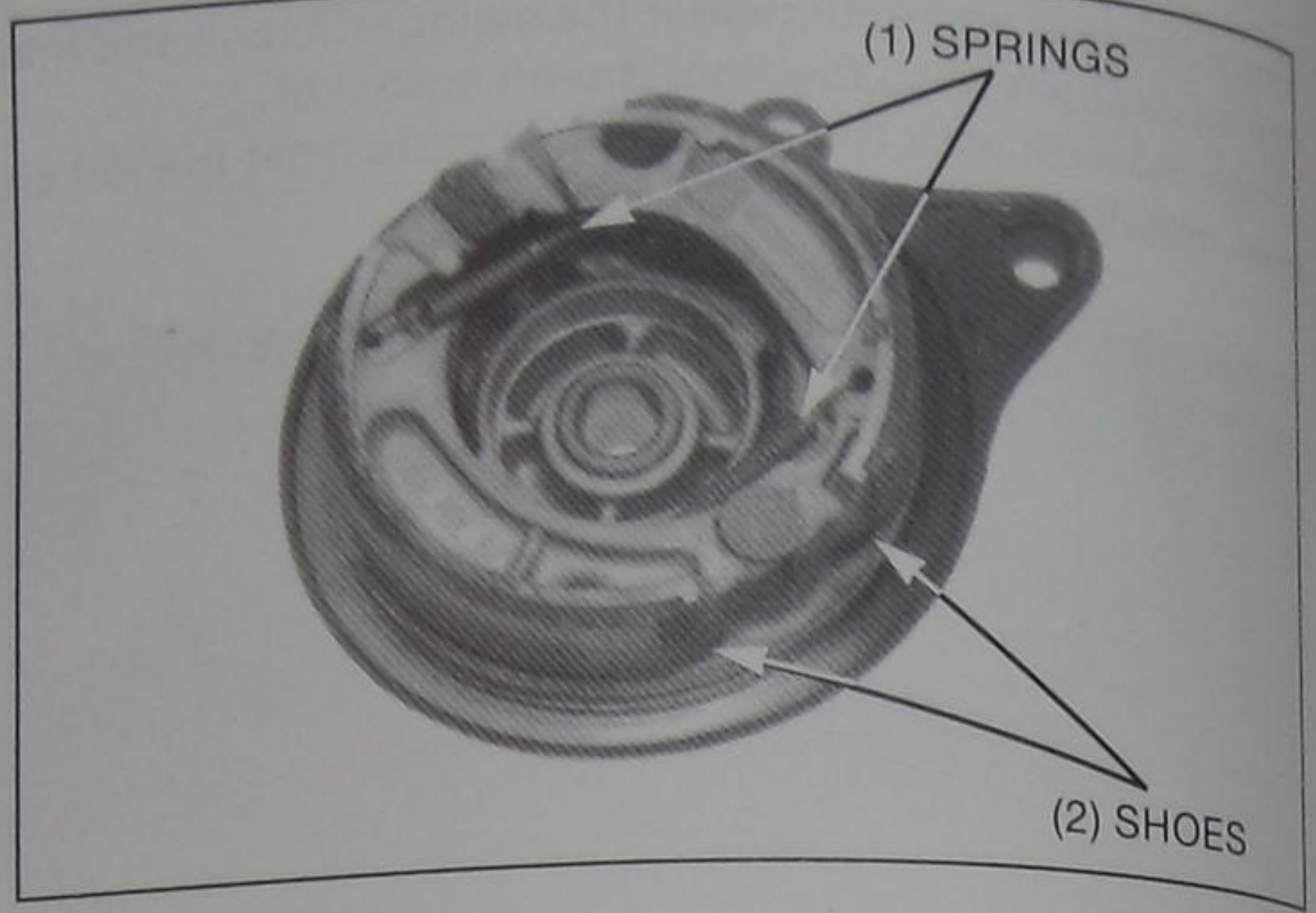


## DISASSEMBLY

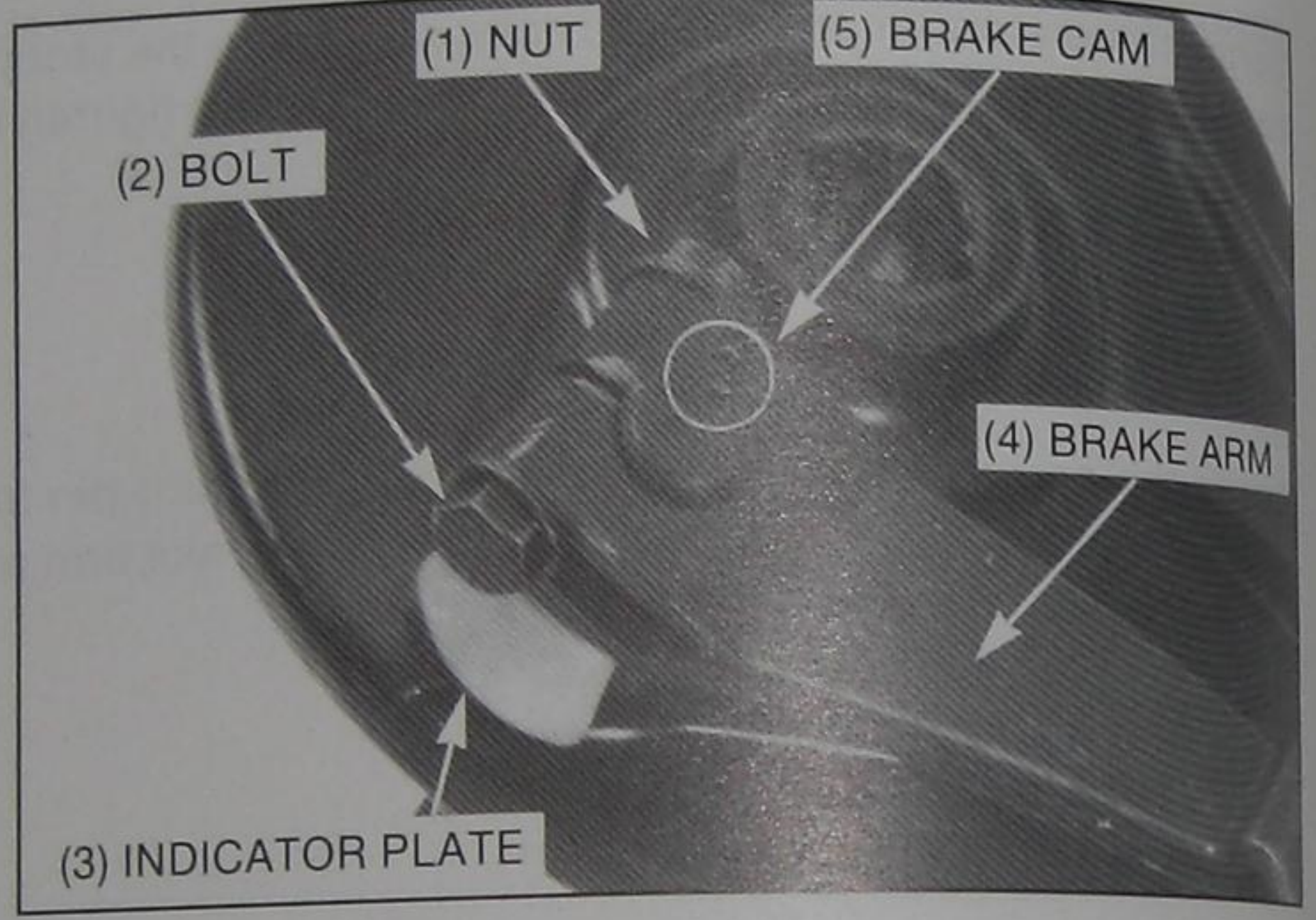
NOTE:

- Always replace the brake shoes in pairs.

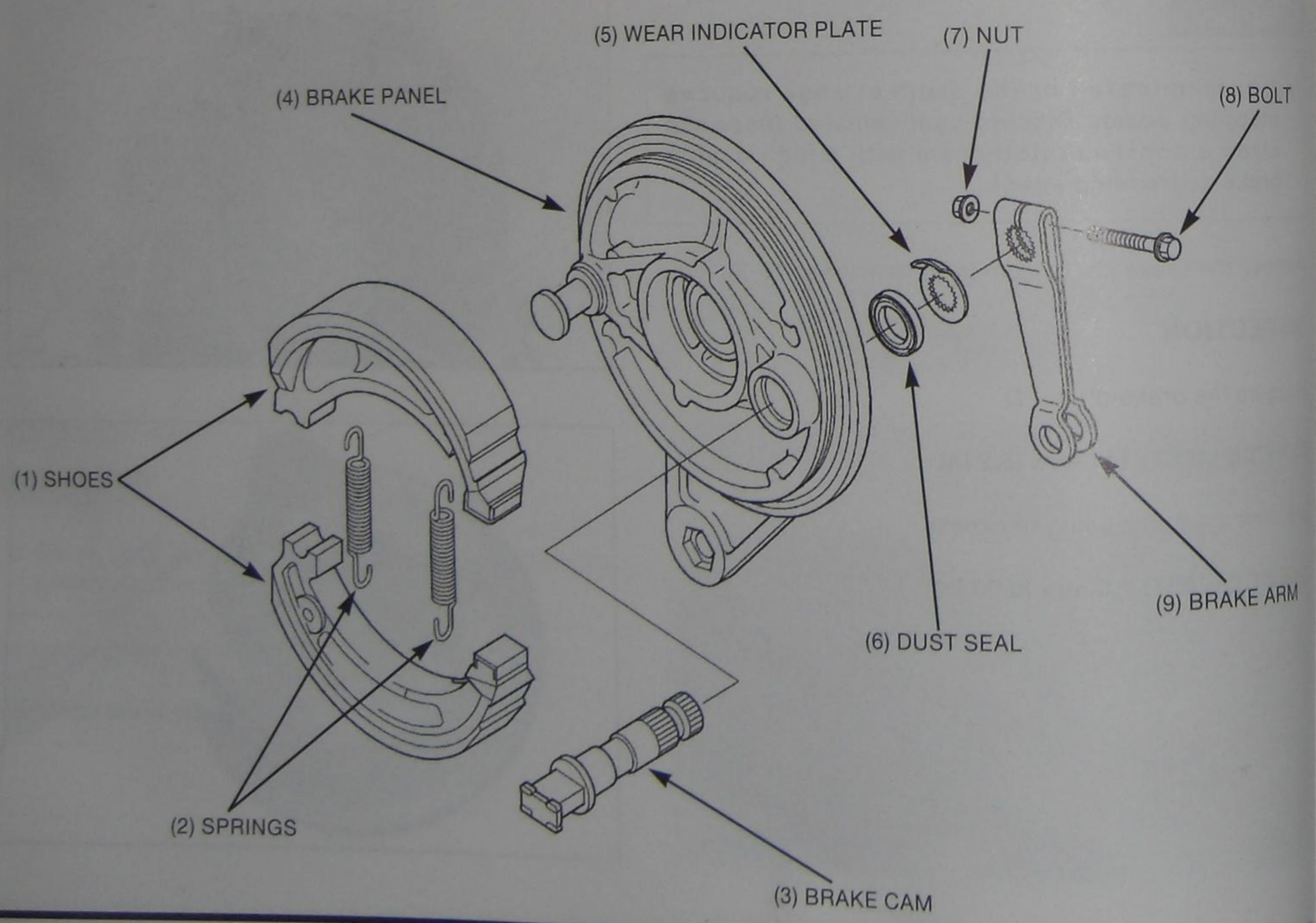
Expand the brake shoes and remove them from the brake cam and anchor pin.
Remove the shoe springs from the shoes.


(1) SPRINGS
(2) SHOES

Remove the following:
- Brake arm nut and bolt
- Brake arm
- Indicator plate
- Brake cam
- Dust seal

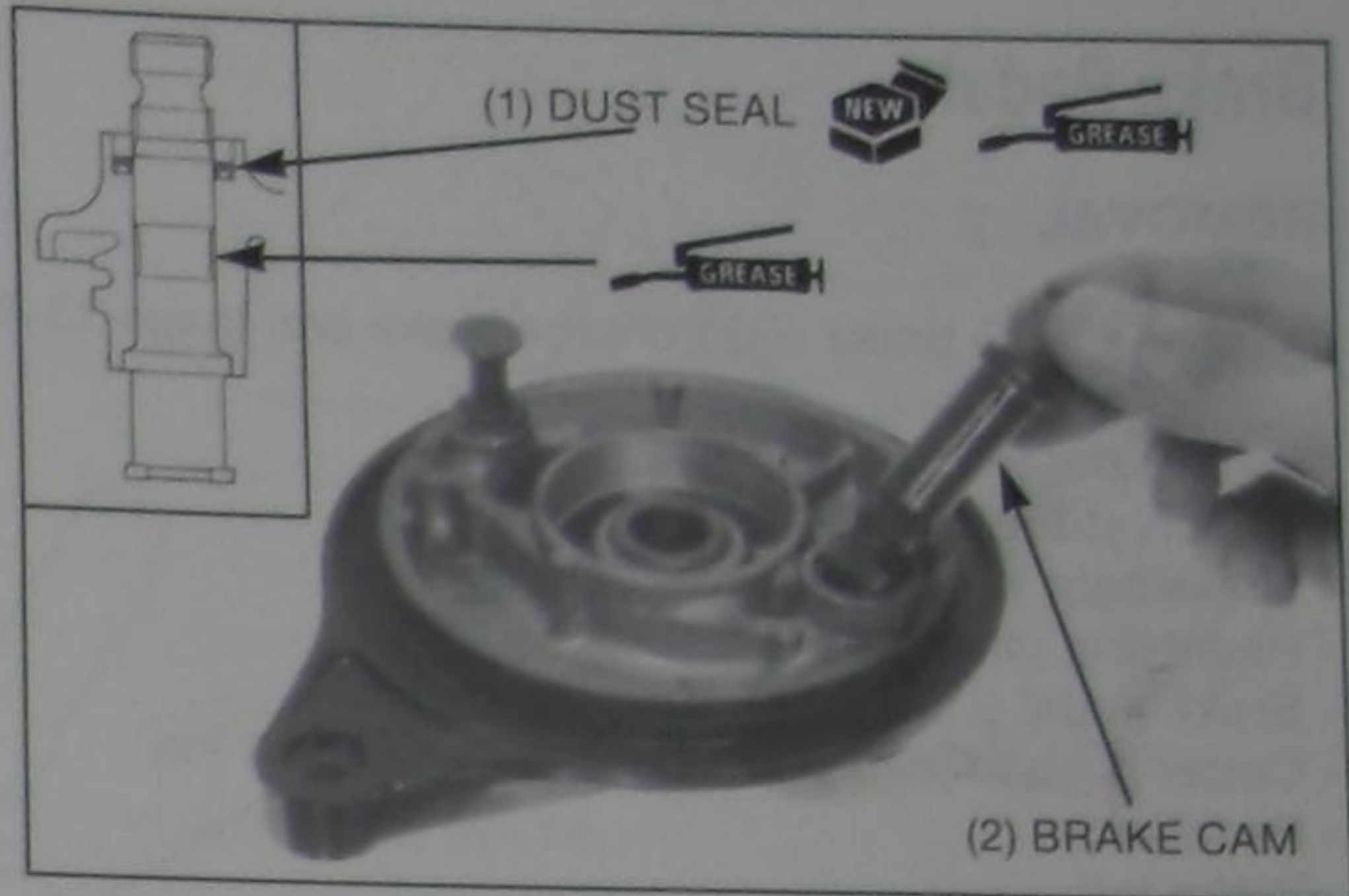

(1) NUT
(5) BRAKE CAM
(2) BOLT
(4) BRAKE ARM
(3) INDICATOR PLATE

## ASSEMBLY

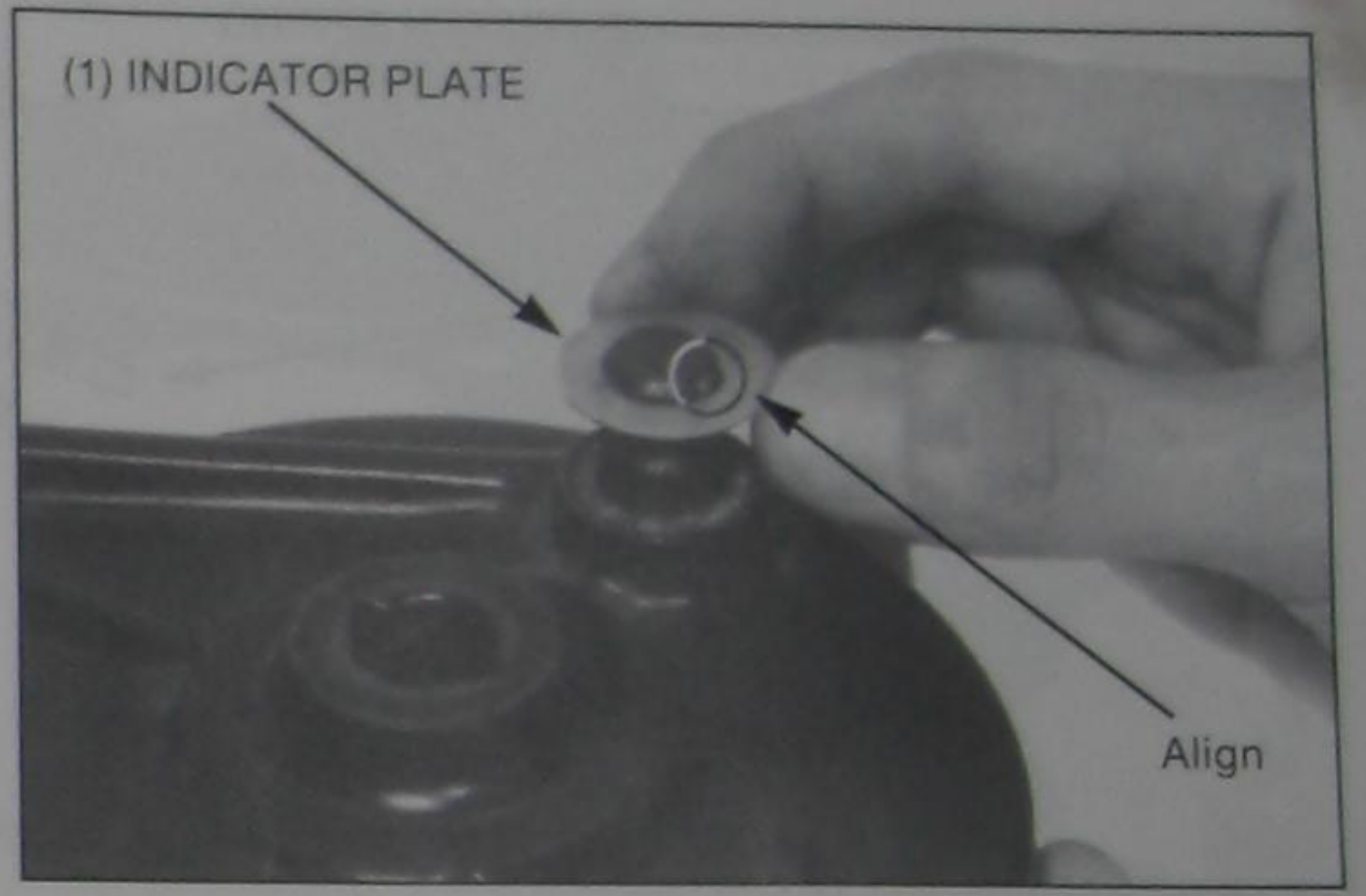

(5) WEAR INDICATOR PLATE
(7) NUT
(4) BRAKE PANEL
(8) BOLT
(1) SHOES
(9) BRAKE ARM
(6) DUST SEAL
(2) SPRINGS
(3) BRAKE CAM

---

Pack a new dust seal lip with grease and install it into the brake panel until it is fully seated.
Apply grease to the brake cam spindle and install it, being careful not to damage the seal lip by the its spline.


(1) DUST SEAL
NEW
GREASE
GREASE
(2) BRAKE CAM

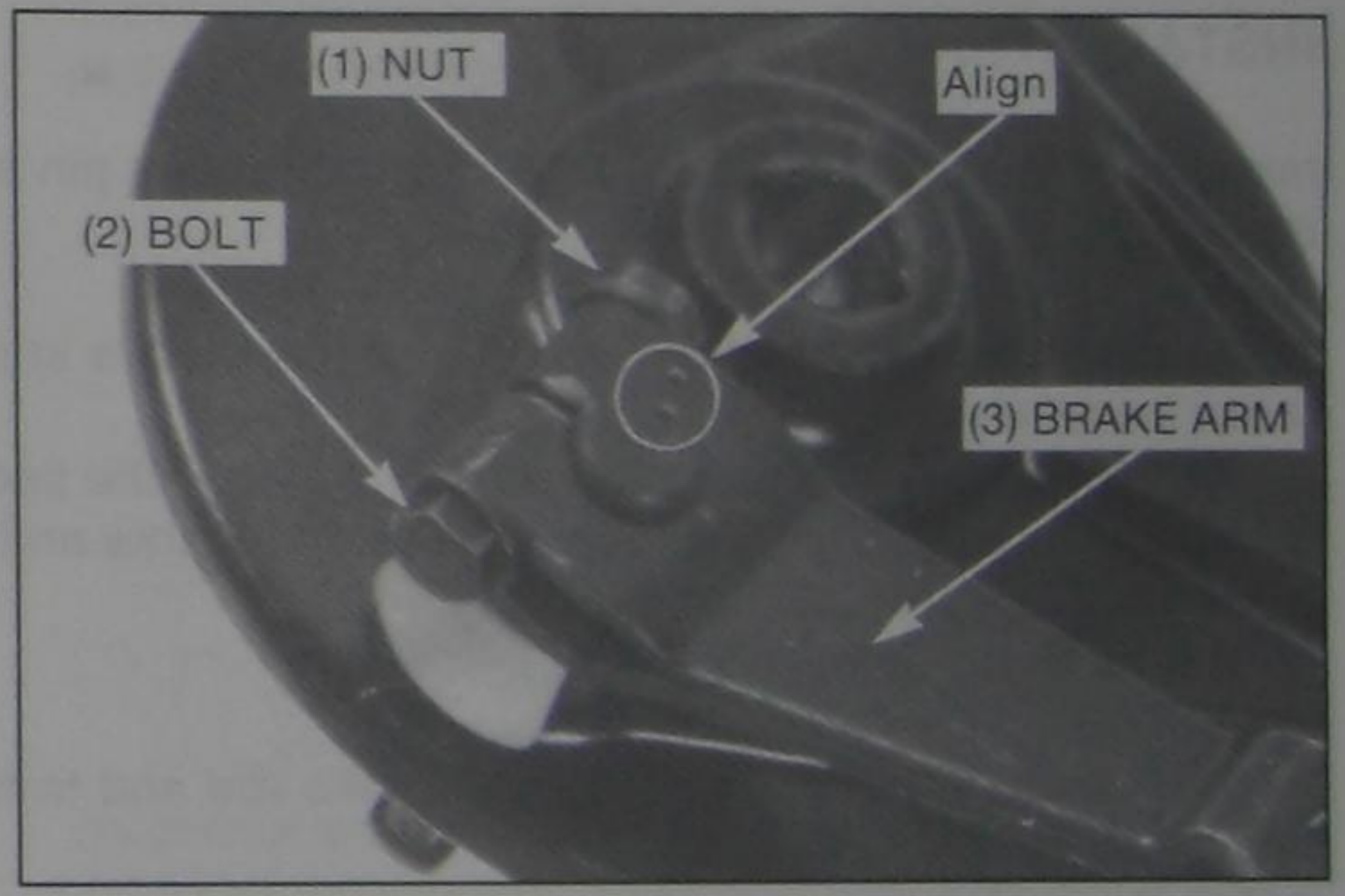
Install the wear indicator by aligning the wide tooth with the wide groove in the brake cam.


(1) INDICATOR PLATE
Align

Install the brake arm by aligning the punch marks on the brake arm and cam.

Install the brake arm bolt and nut and tighten the it.

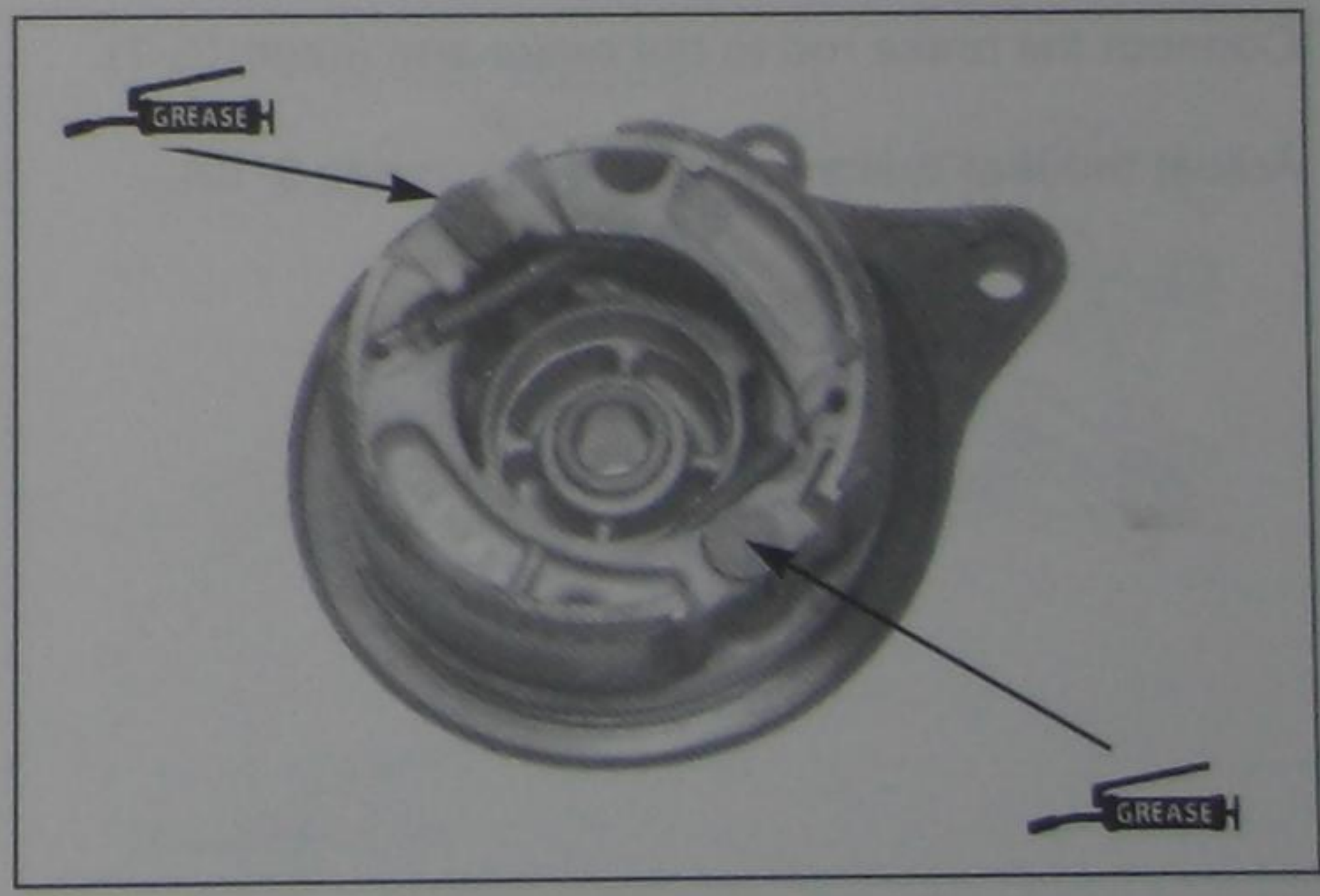
**TORQUE: 10 N·m (1.0 kgf-m, 7 lbf-ft)**


(1) NUT
Align
(2) BOLT
(3) BRAKE ARM

Apply grease to the anchor pin and brake cam sliding surfaces.

Assemble the brake shoes and springs as shown.
Install the shoe assembly onto the brake panel.
Wipe any excess grease of the brake cam and anchor pin.

Install the rear wheel (page 13-6).

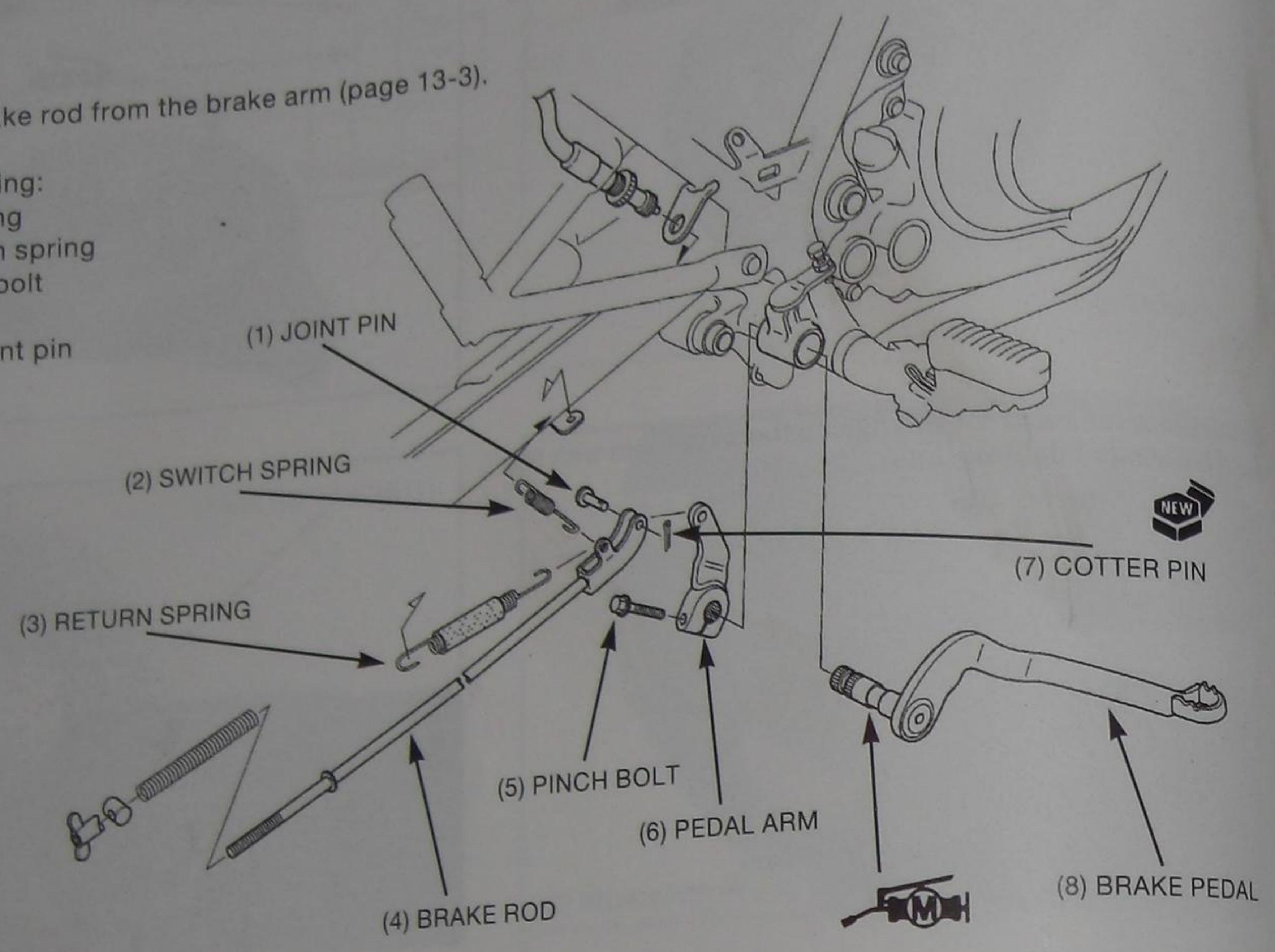

GREASE
GREASE

## Brake Pedal

### REMOVAL

Disconnect the brake rod from the brake arm (page 13-3).

Remove the following:
- Pedal return spring
- Brake light switch spring
- Pedal arm pinch bolt
- Brake pedal
- Cotter pin and joint pin
- Pedal arm
- Brake rod.


(1) JOINT PIN
(2) SWITCH SPRING
(3) RETURN SPRING
(4) BRAKE ROD
(5) PINCH BOLT
(6) PEDAL ARM
(7) COTTER PIN
NEW
(8) BRAKE PEDAL

### INSTALLATION

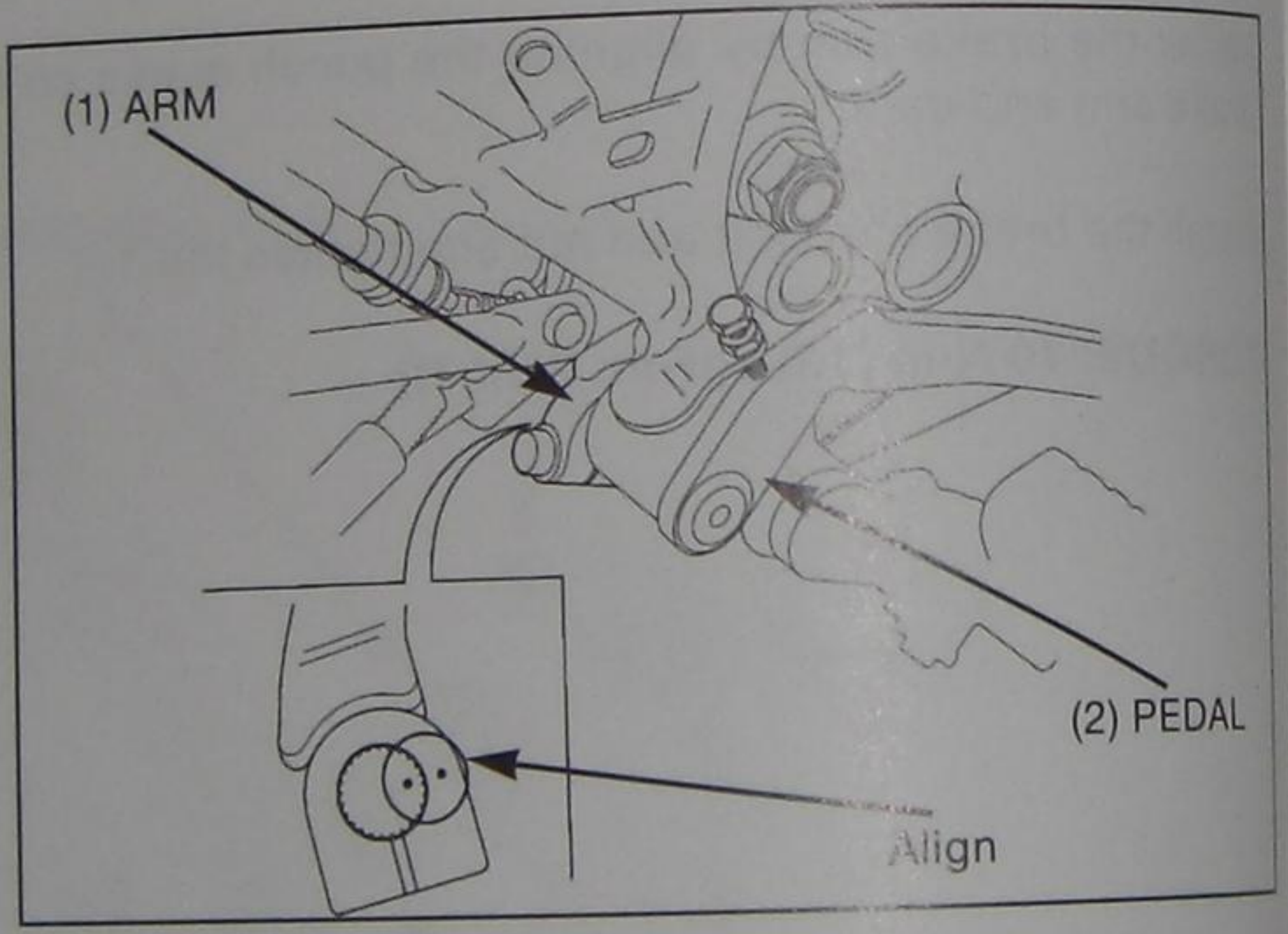
Install the brake rod to the brake arm with the joint pin and cotter pin.

Apply molybdenum disulfide grease into the groove in the brake pedal pivot.
Insert the brake pedal into the frame and install the pedal arm onto the pedal pivot, aligning the punch marks on the brake pedal and arm.
Install the pinch bolt and tighten it.

Install the pedal return spring to the brake rod and to the swingarm as shown.
Install the switch spring to the brake rod as shown.

Connect the brake rod to the brake arm (page 13-7).

Adjust the rear brake pedal free play (page 3-12).


(1) ARM
(2) PEDAL
Align

---

## Shock Absorber/Linkage

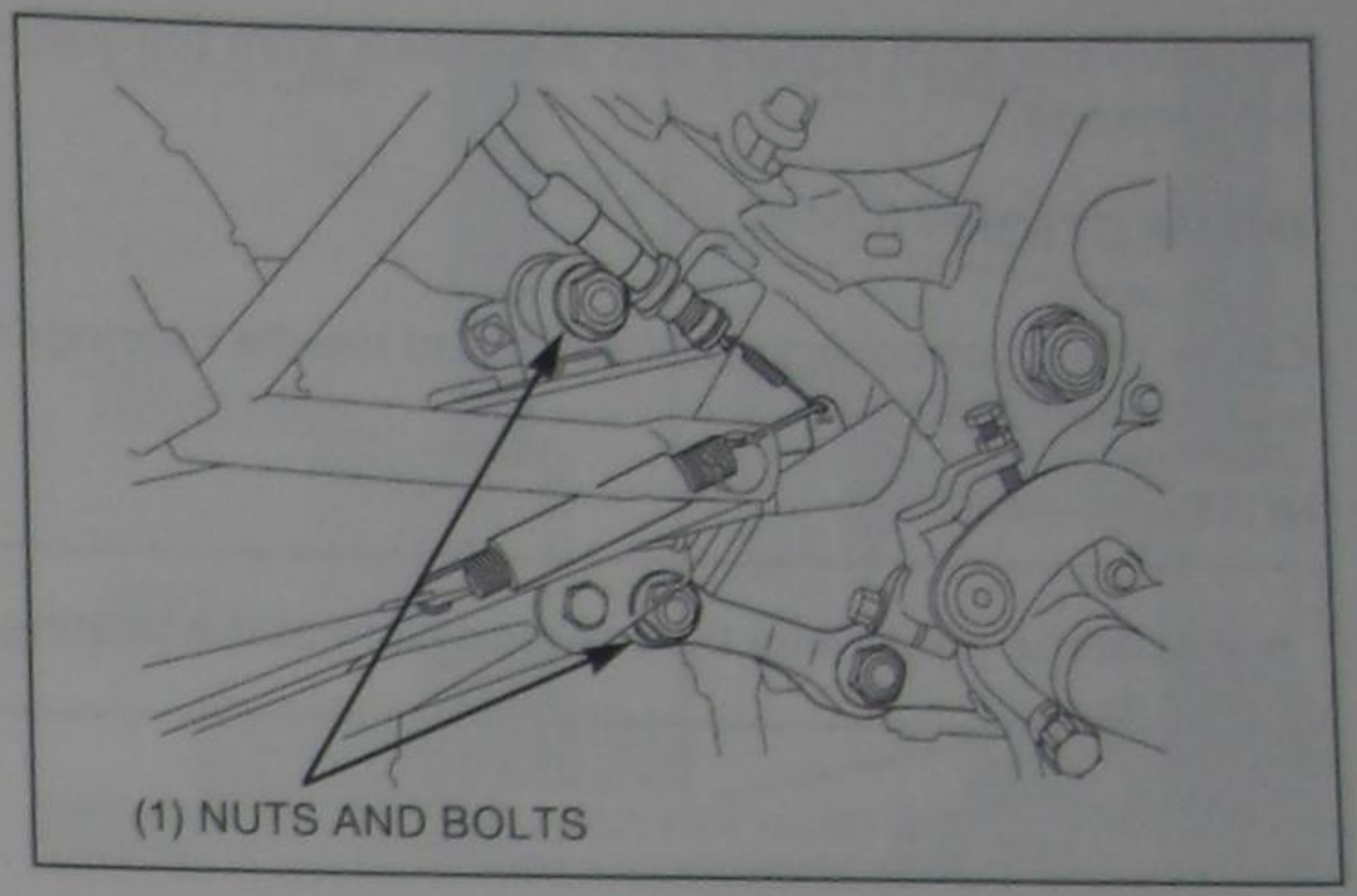
CAUTION

- **Be careful not to damage the frame, swingarm and linkage when removing and installing.**

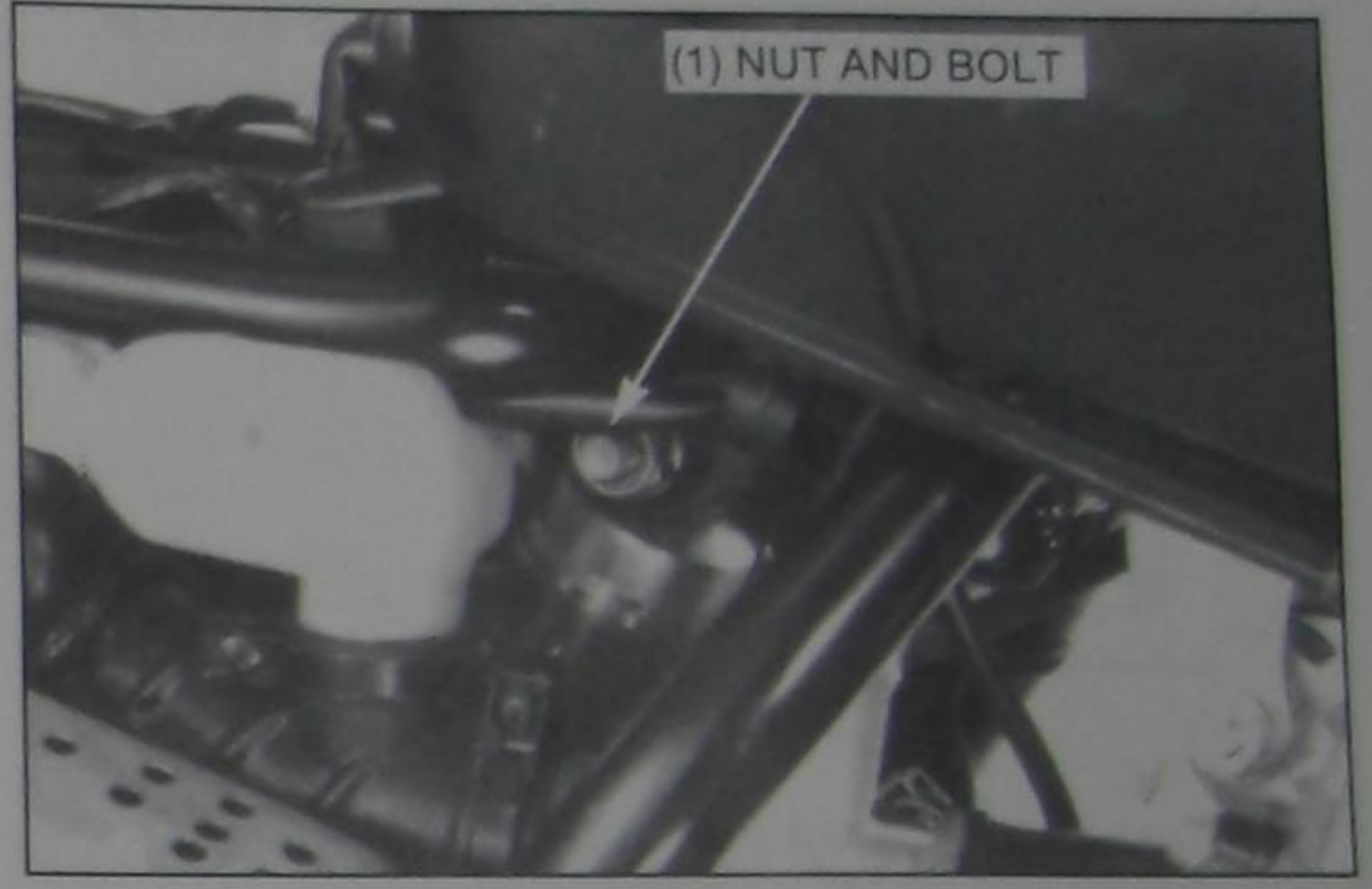
### REMOVAL

Raise the rear wheel off the ground and support the motorcycle securely with a hoist or equivalent, and hold the swingarm.

Remove the seat (page 2-2).

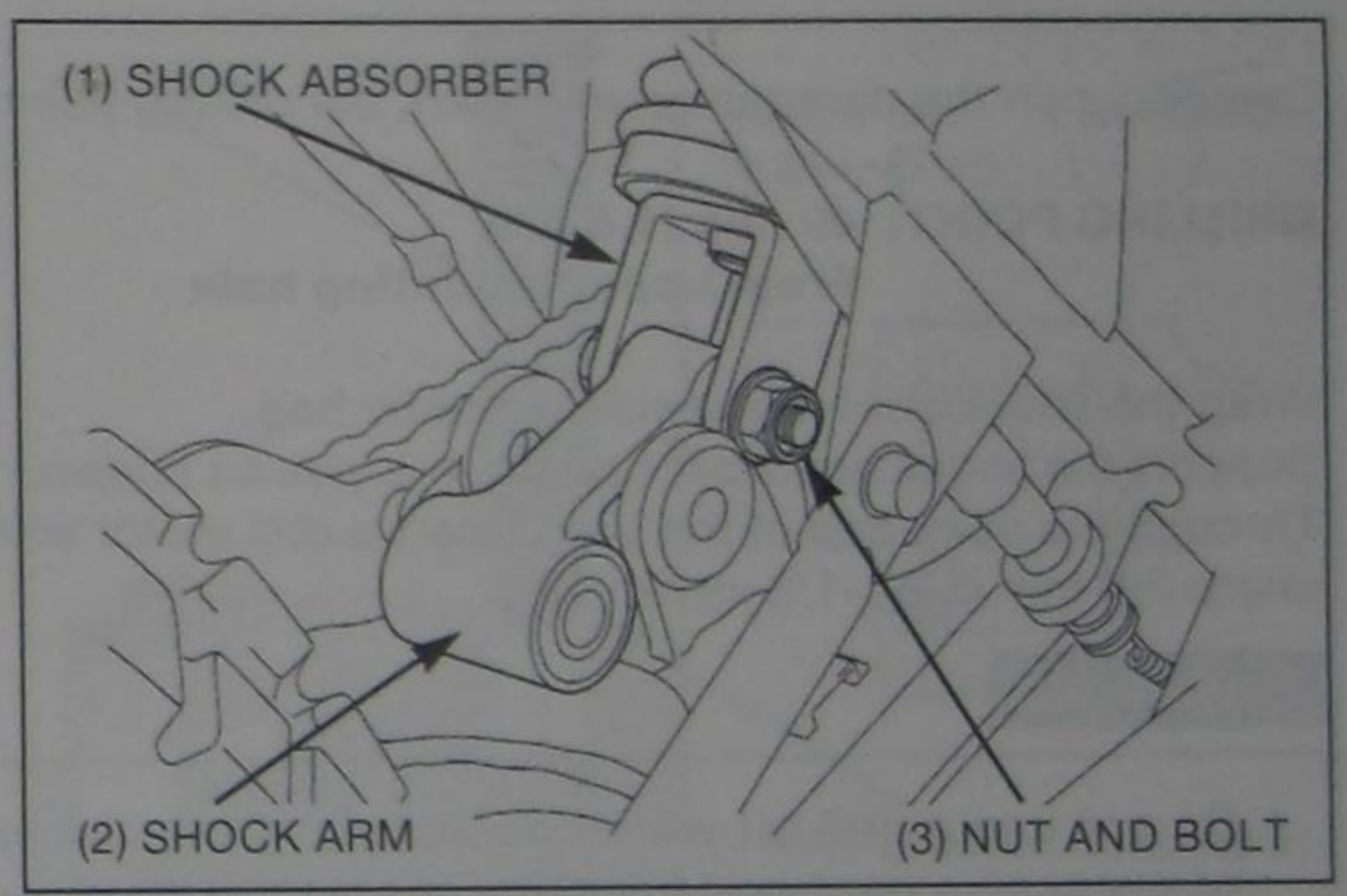

(1) NUTS AND BOLTS

Remove the following fasteners:
- Shock arm-to-swingarm nut and bolt
- Shock link-to-shock arm nut and bolt
- Shock absorber upper mounting nut and bolt.

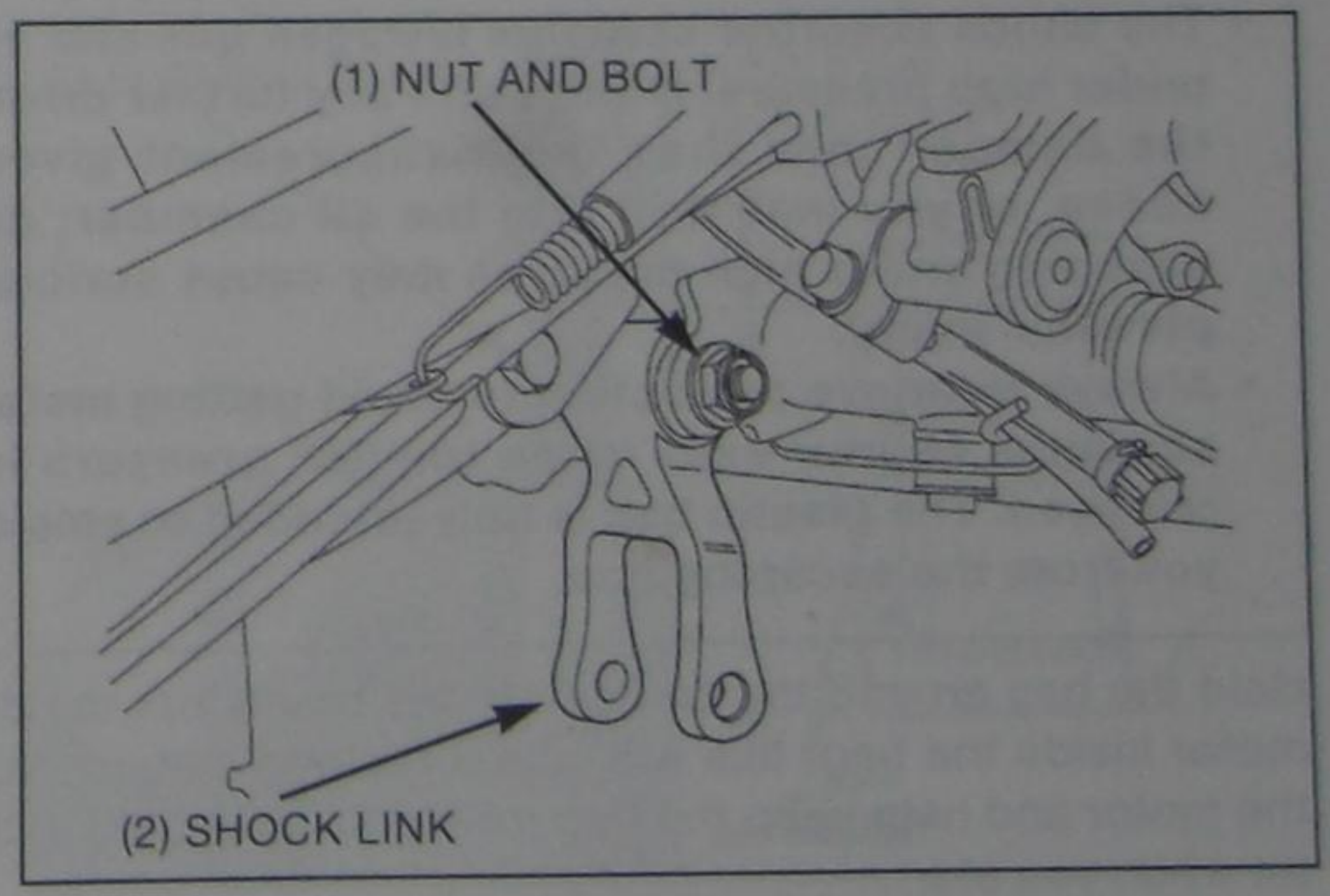

(1) NUT AND BOLT

Lower the swingarm while sliding the shock arm rearward until the shock absorber lower mounting nut and bolt can be removed.

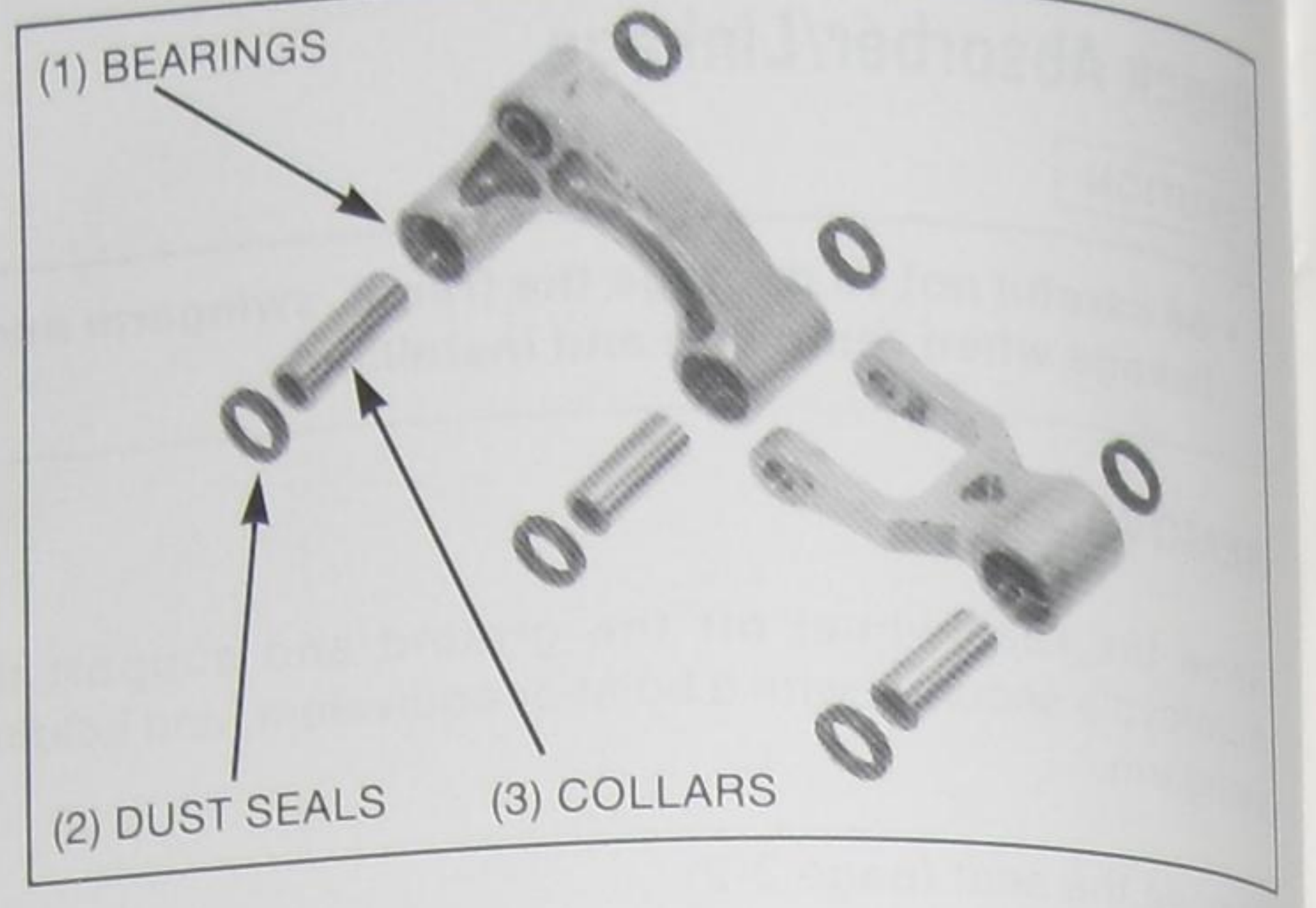
Remove the following:
- Shock absorber lower mounting nut and bolt
- Shock absorber and shock arm


(1) SHOCK ABSORBER
(2) SHOCK ARM
(3) NUT AND BOLT

- Shock link-to-frame nut, bolt and shock link.


(1) NUT AND BOLT
(2) SHOCK LINK

Remove the pivot collars and dust seals from the suspension linkage.



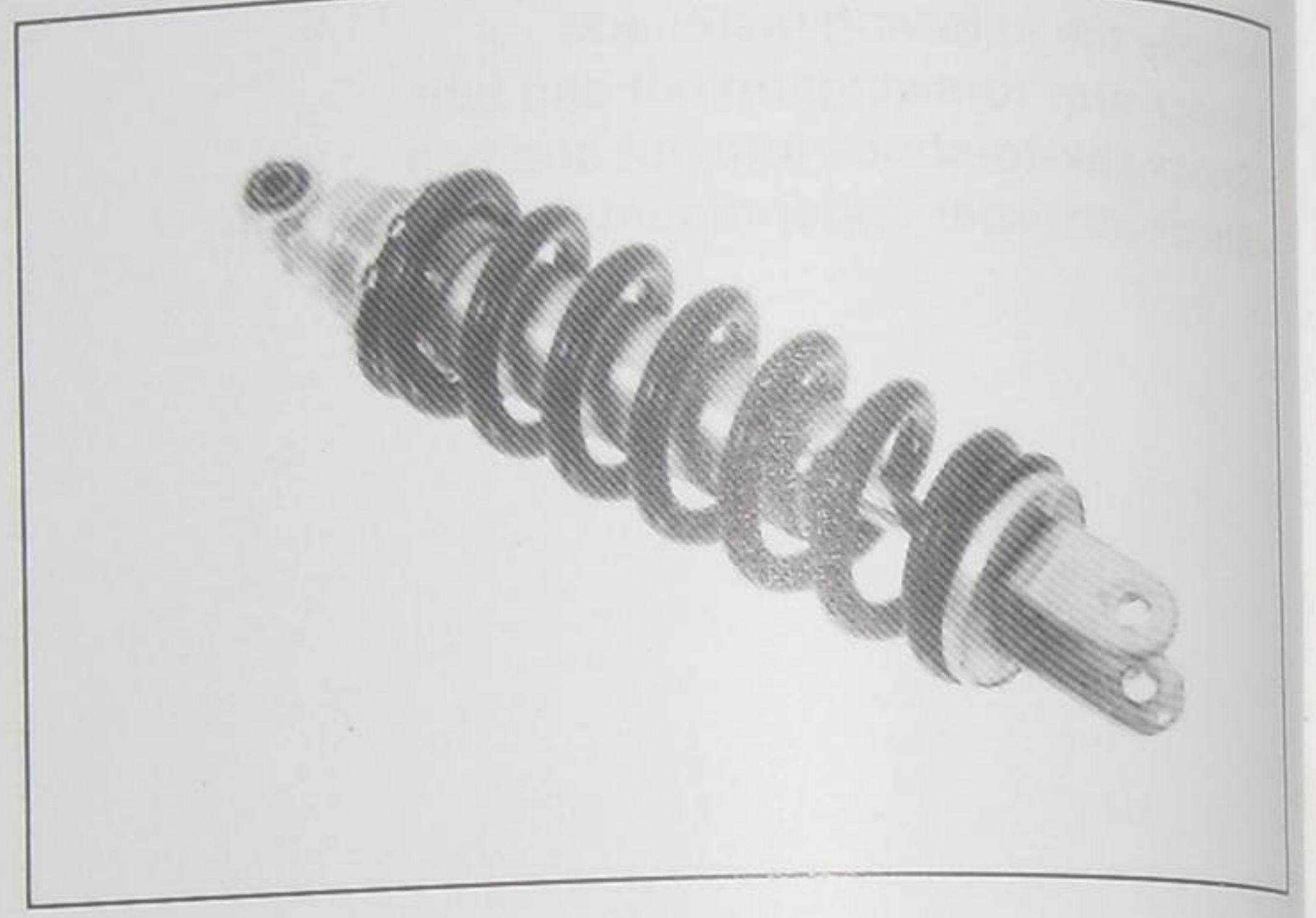
### INSPECTION

Check the pivot collars, dust seals and needle bearings for wear or damage.

NOTE:

- Be careful not to lose the needle rollers of the bearing.

Check the damper unit for leakage or other damage.
Check the upper joint bushing for wear or damage.
Replace the shock absorber assembly if necessary.

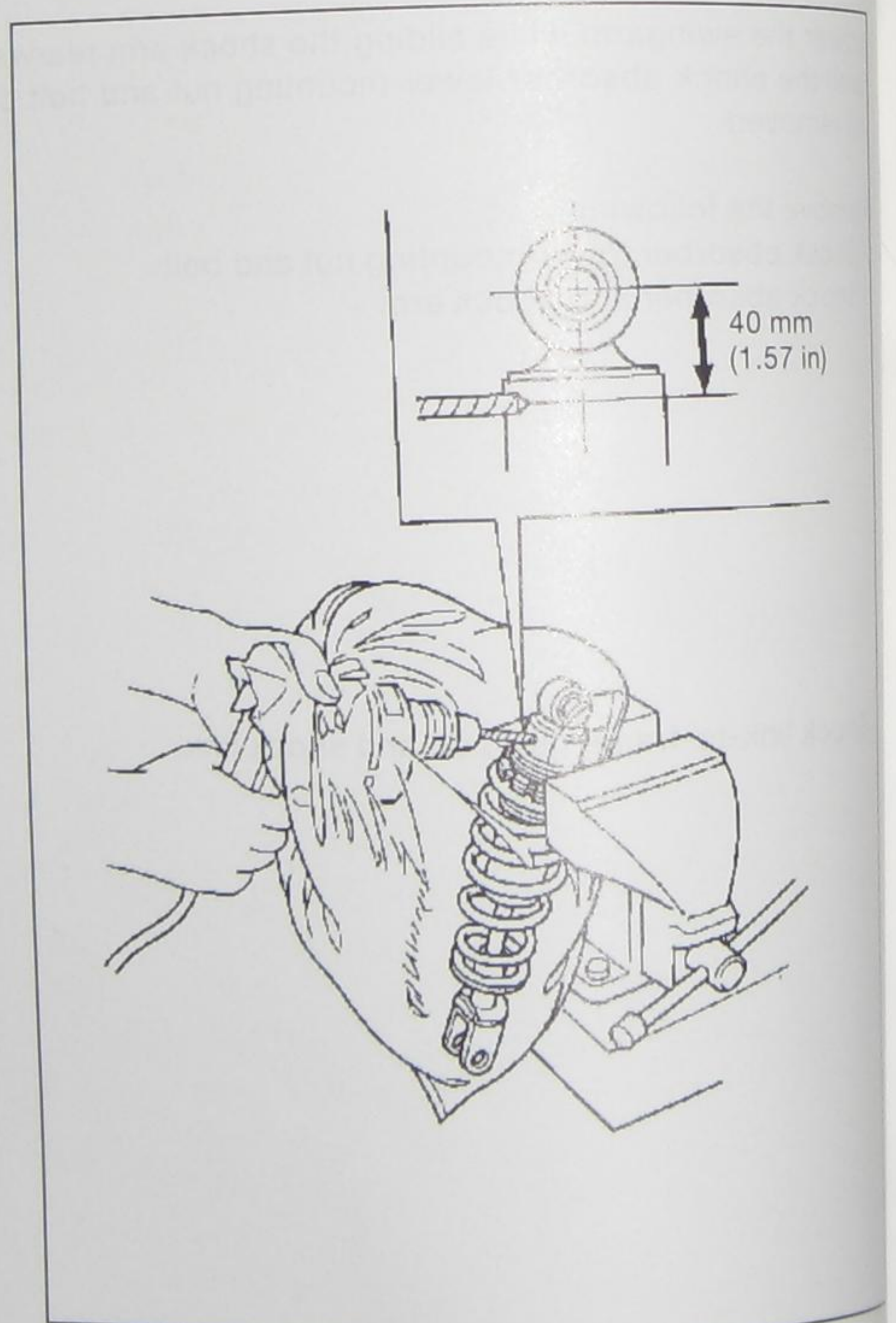


### SHOCK ABSORBER DISPOSAL

Center punch the damper case to mark the drilling point.

**DRILLING POINT:** **40 mm (1.57 in)**
**From upper mounting hole**

Wrap the shock absorber inside a plastic bag.
Support the shock absorber upright in a vise as shown.
Through the open end of the bag, insert a drill motor with a sharp 2-3 mm (5/64-1/8 in) drill bit.



**⚠ WARNING**

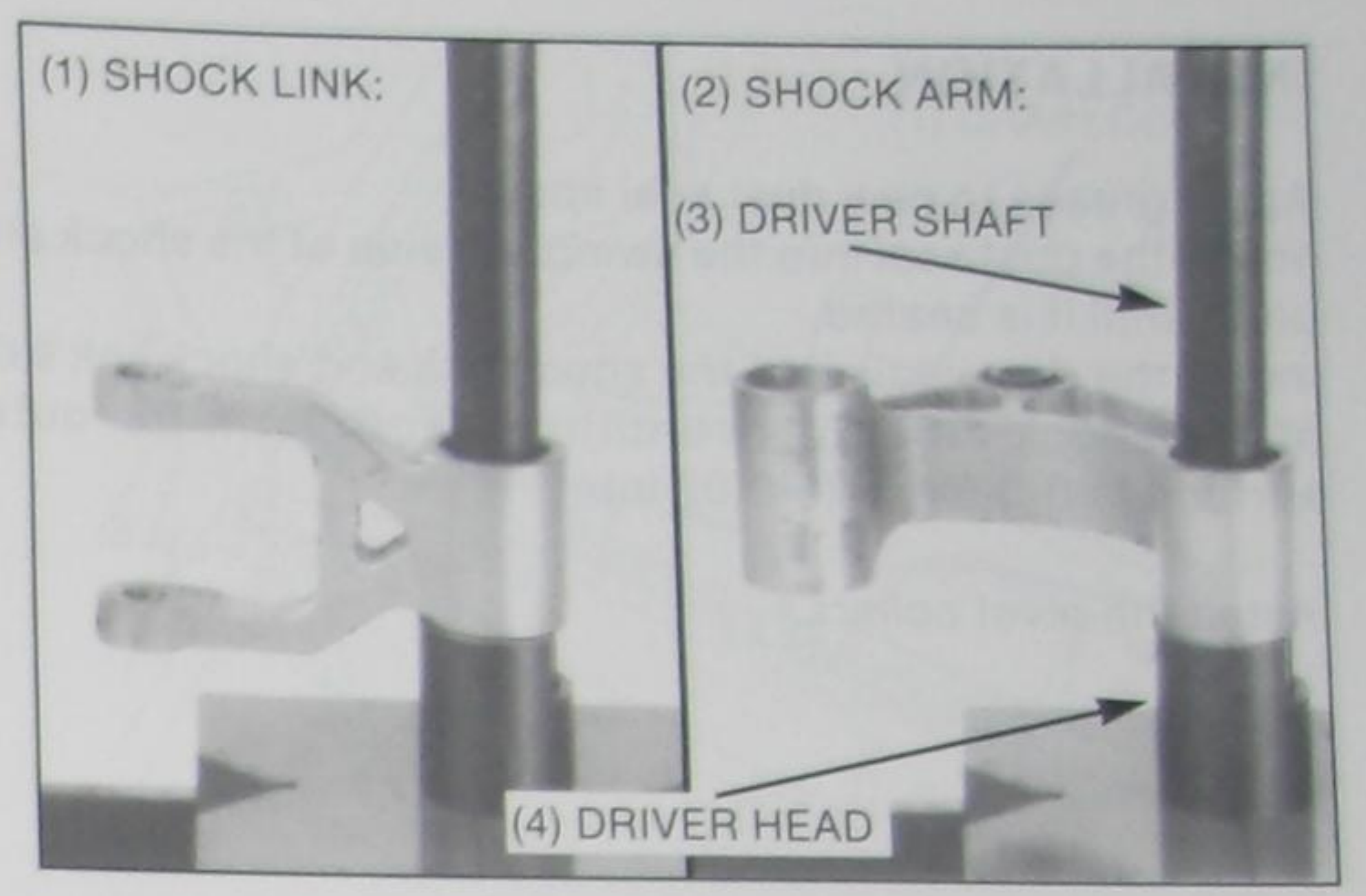
- **Do not use a dull bit which could cause a build-up of excessive heat and pressure inside the damper, leading to explosion and severe personal injury.**
- **The shock absorber contains nitrogen gas and oil under high pressure. Do not drill any further down the damper case than the measurement given above, or you may drill into the oil chamber; oil escaping under high pressure may cause serious personal injury.**
- **Always wear eye protection to avoid getting metal shavings in your eyes when the gas pressure is released. The plastic bag is only intended to shield you from the escaping gas.**

Hold the bag around the drill motor and briefly run the drill motor inside the bag; this will inflate the bag with air from the motor and help keep the bag from getting caught in the bit when you start.

### SUSPENSION LINKAGE PIVOT BEARING REPLACEMENT

Press each needle bearing out of the shock link and shock arm pivots using the special tools.

**TOOLS:**
**Driver shaft** 07946-MJ00100
**Driver head** 07946-MJ00200



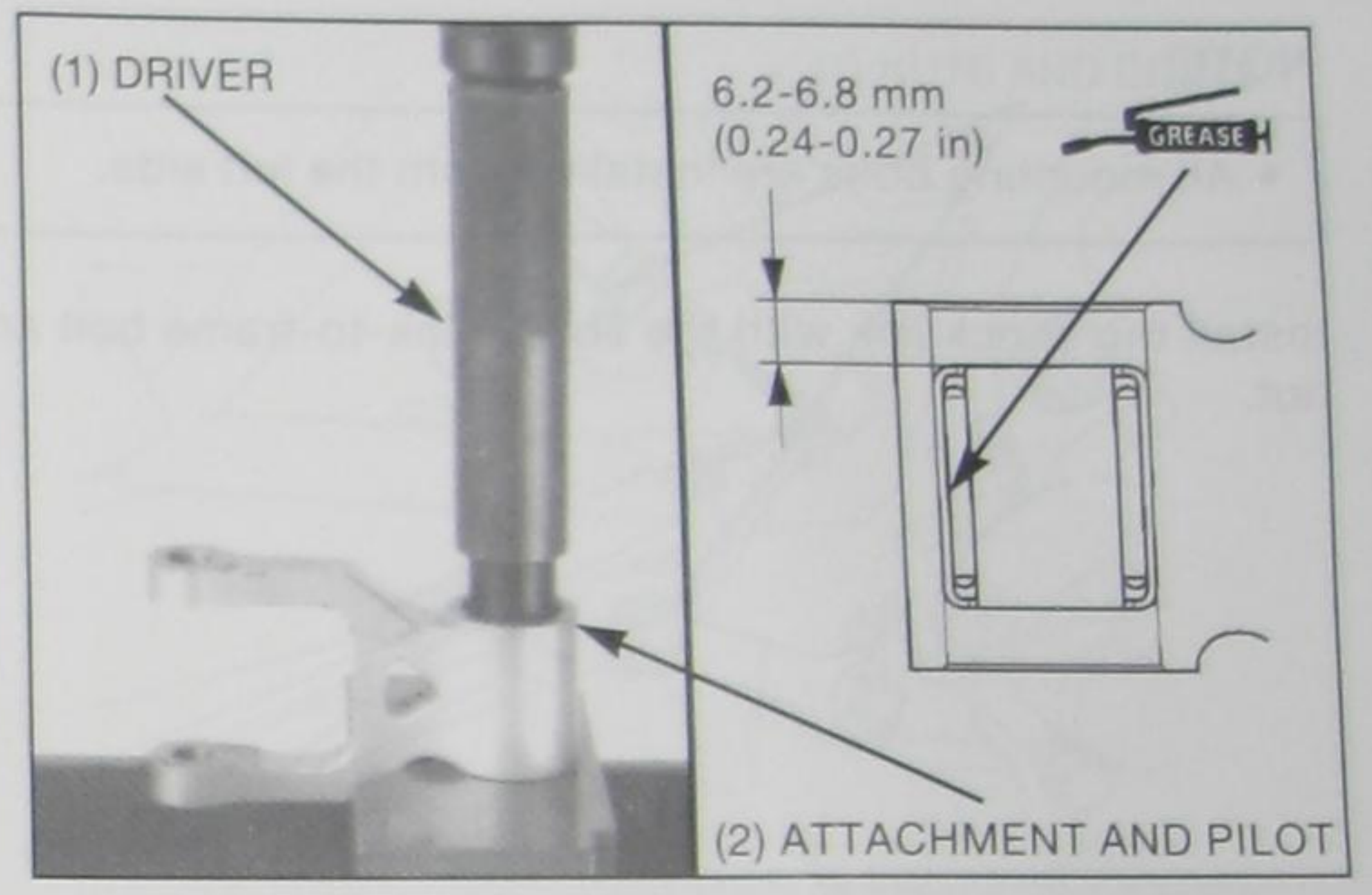
**SHOCK LINK AND SHOCK ARM (Shock link side)**

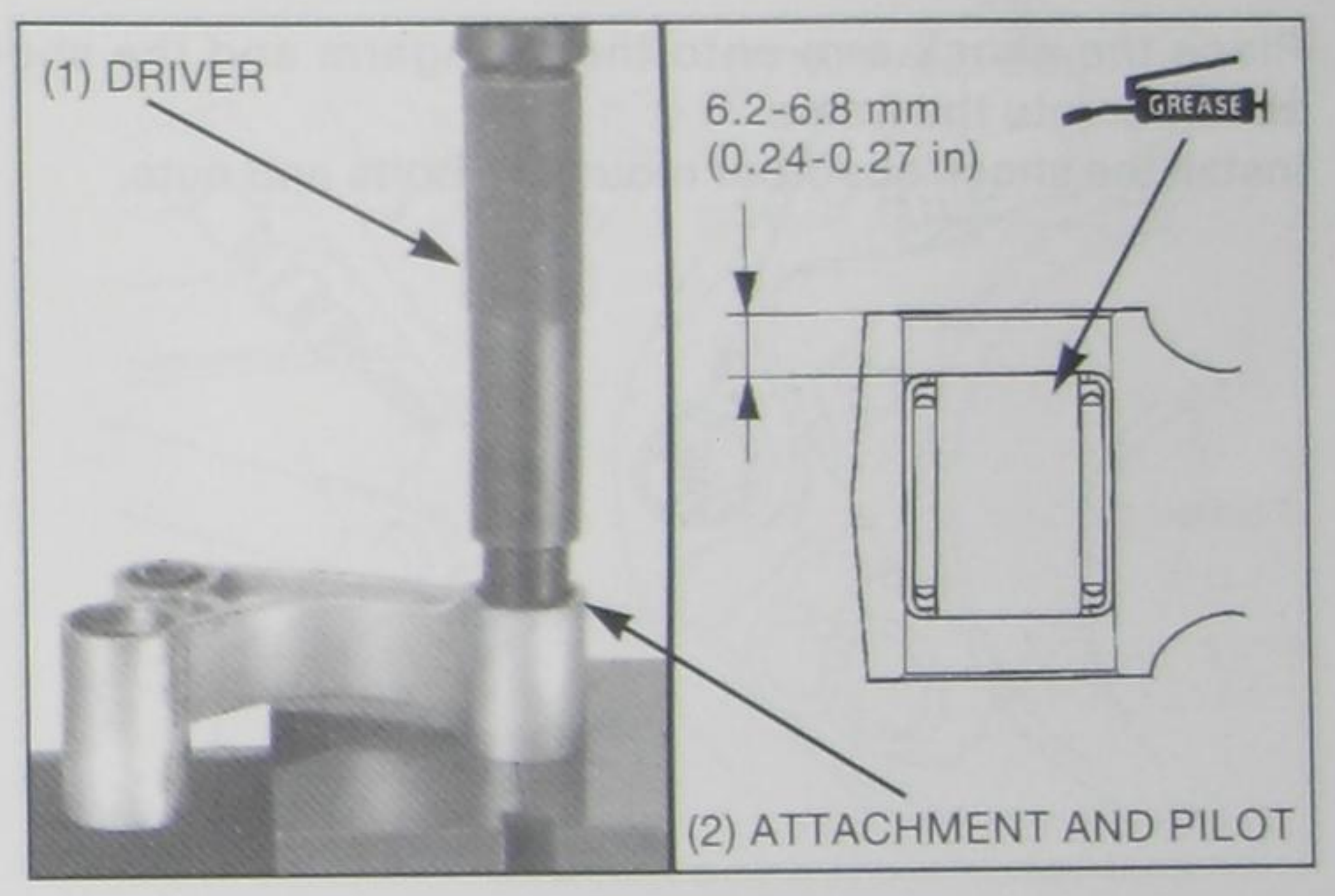
Apply grease to the needle rollers of new bearings.
Carefully press each needle bearing in the pivots until the depth from the outer surface is 6.2-6.8 mm (0.24-0.27 in), using the special tools.

NOTE:

- Press in the bearing with the marking side facing up.

**TOOLS:**
**Driver** 07749-0010000
**Attachment, 22 x 24 mm** 07746-0010800
**Pilot, 17 mm** 07746-0040400





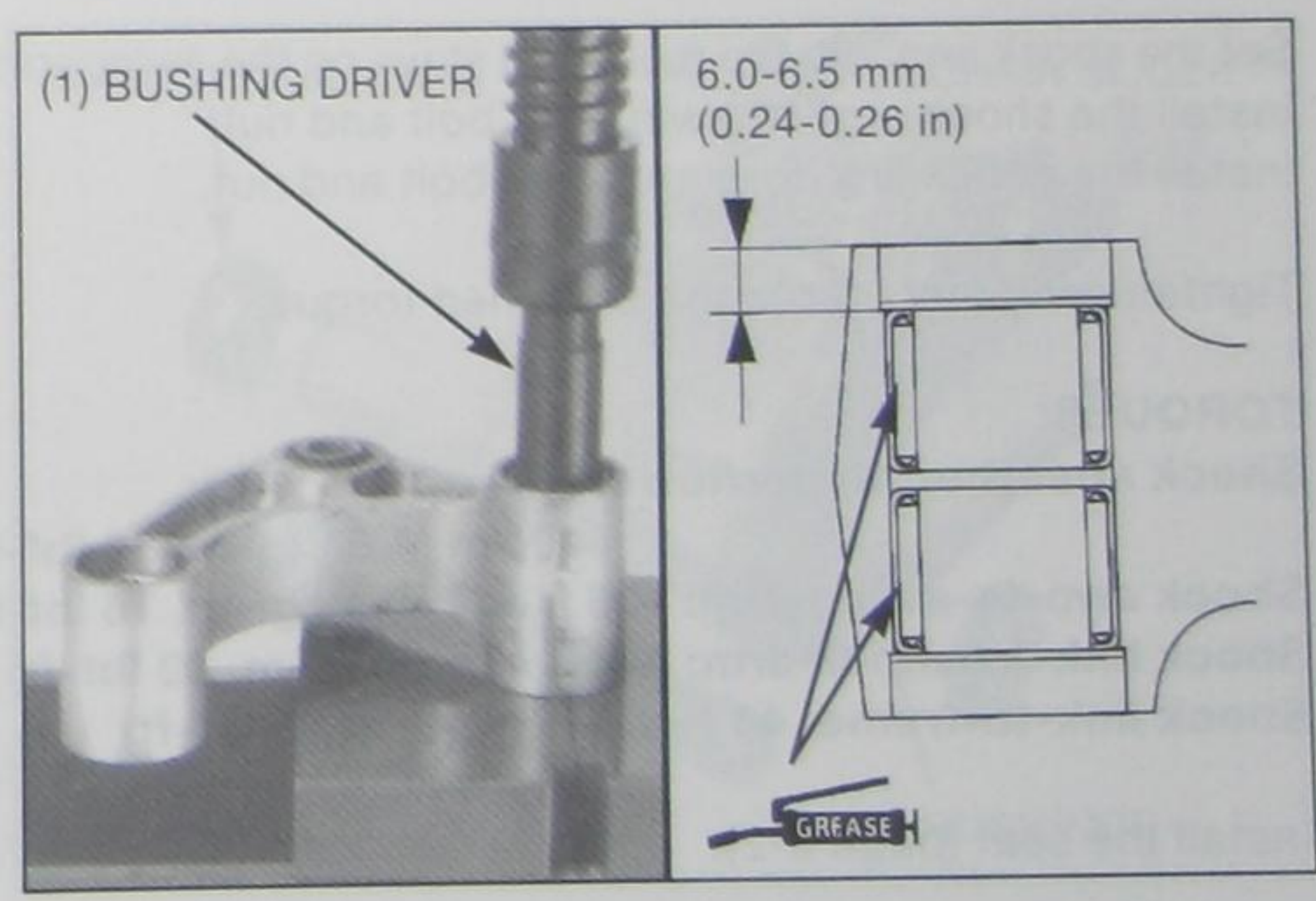
**SHOCK ARM (Swingarm side)**

Apply grease to the needle rollers of a new bearing.
Carefully press each needle bearing in the pivot until the depth from the outer surface is 6.0-6.5 mm (0.24-0.26 in), using the special tool.

NOTE:

- Press in the bearing with the marking side facing up.

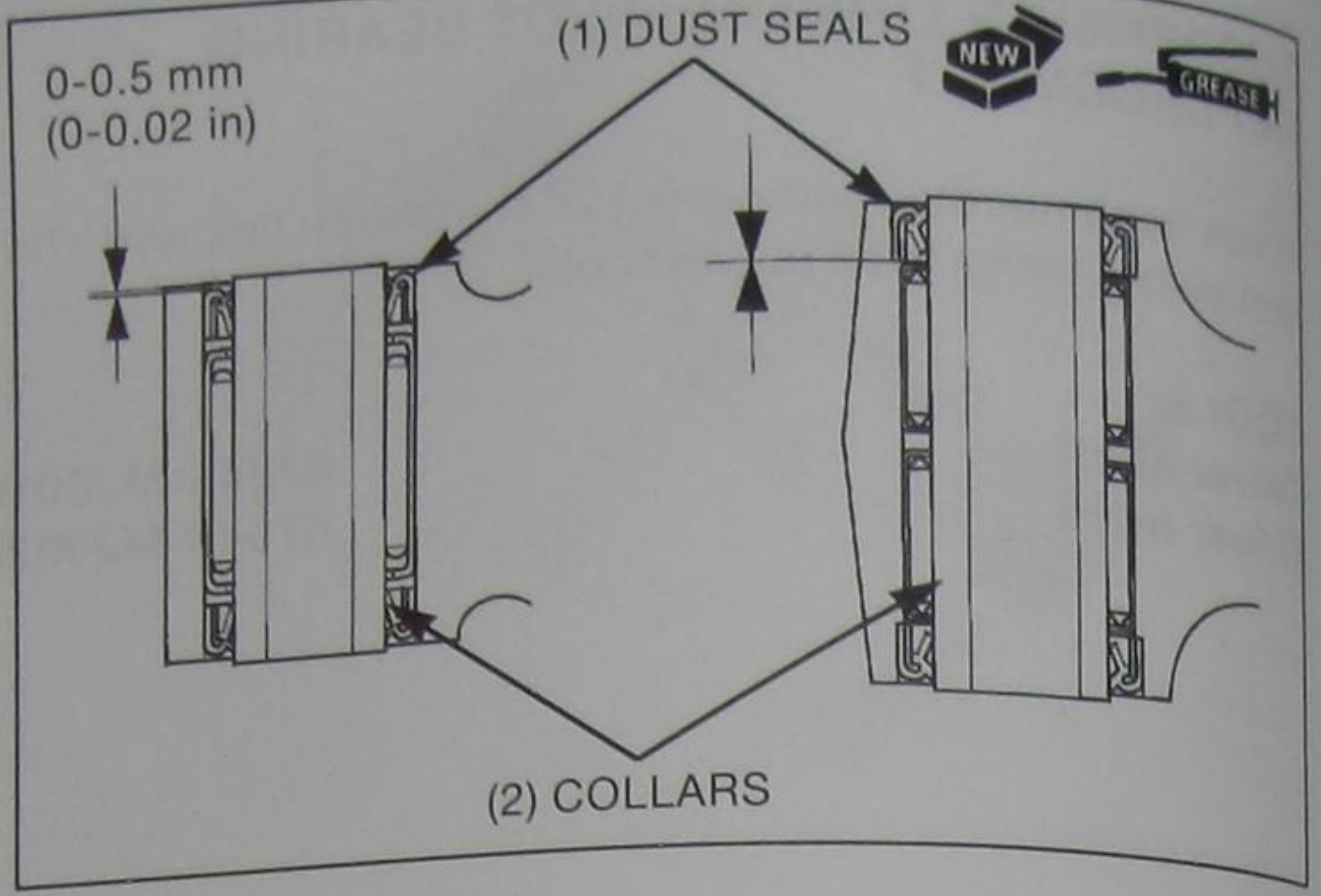
**TOOL:**
**Bushing driver** 07HMF-MM90200



### INSTALLATION

Apply grease to new dust seal lips.
Install the dust seal into the swingarm side of the shock arm pivot until it is seated.
Install the dust seals into the shock link and shock link side of the shock arm pivots until the depth from the outer surface is 0-0.5 mm (0-0.02 in).

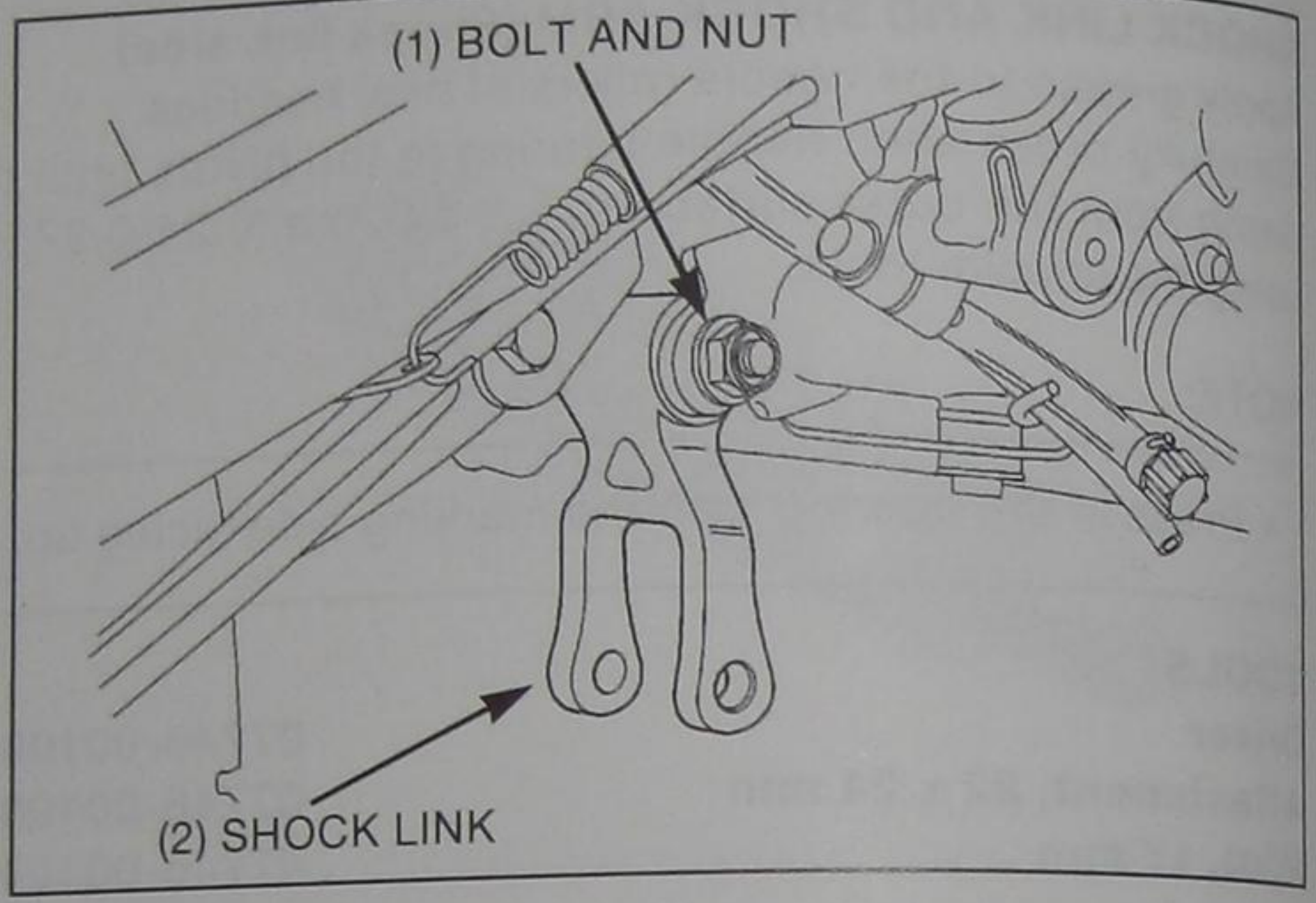
Install the pivot collars.


0-0.5 mm
(0-0.02 in)
(1) DUST SEALS
NEW
GREASE
(2) COLLARS

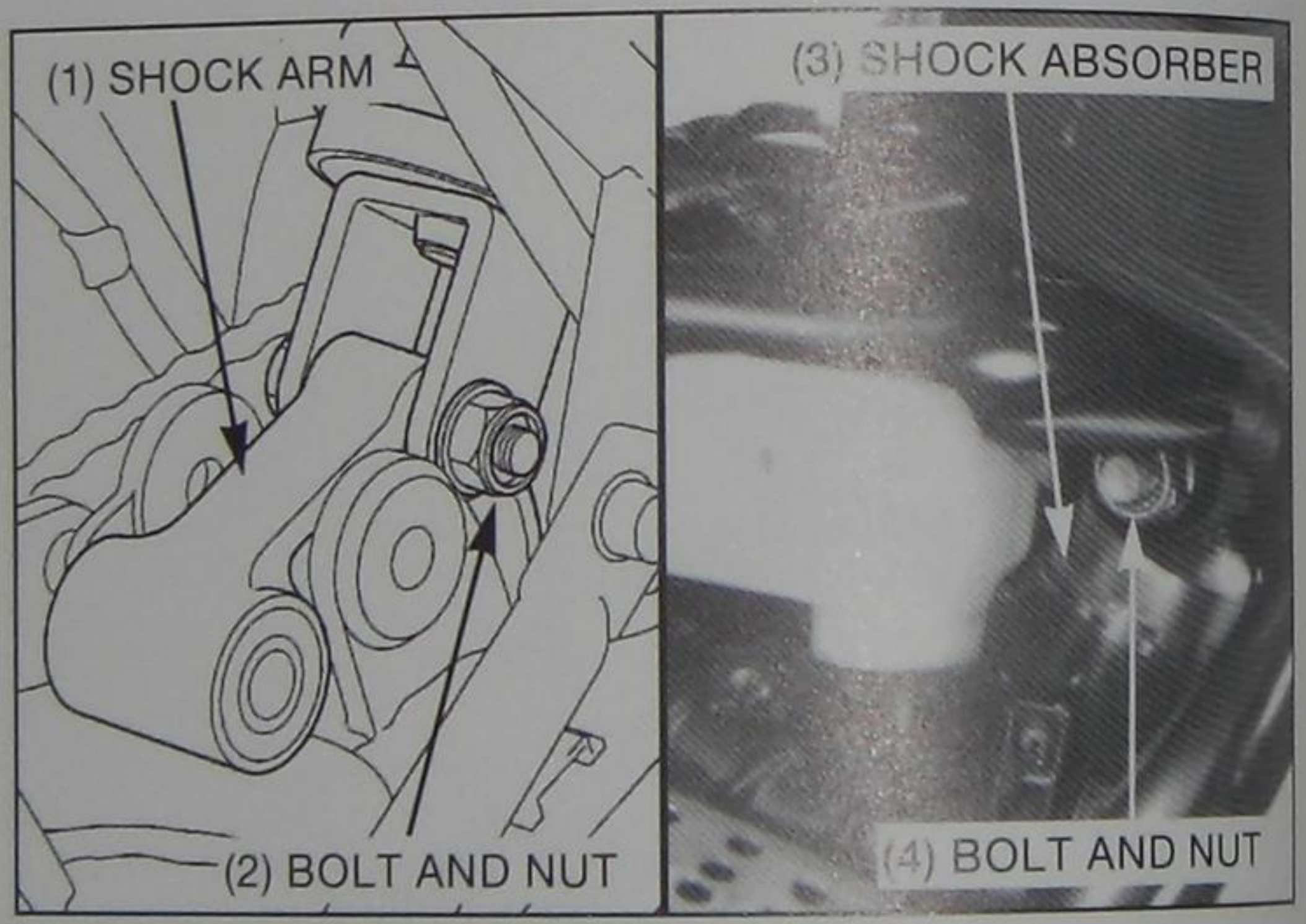
NOTE:

- All mounting bolts are installed from the left side.

Install the shock link with the shock link-to-frame bolt and nut.


(1) BOLT AND NUT
(2) SHOCK LINK

Place the shock arm onto the swingarm and the shock absorber into the frame.
Install the shock absorber mounting bolts and nuts.

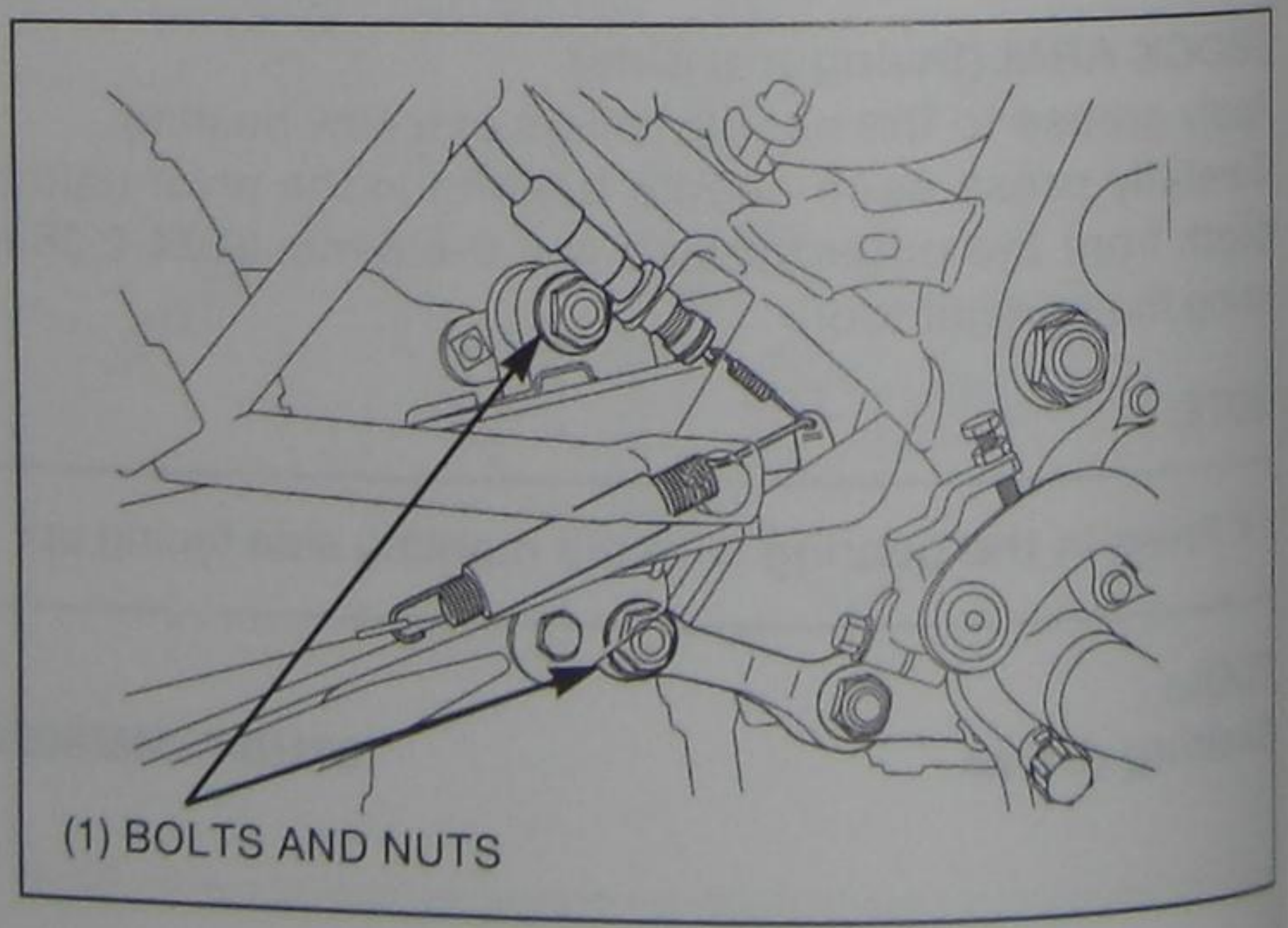

(1) SHOCK ARM
(2) BOLT AND NUT
(3) SHOCK ABSORBER
(4) BOLT AND NUT

Set the shock arm into the mounting stays on the swingarm.
Install the shock arm-to-swingarm bolt and nut.
Install the shock link-to-shock arm bolt and nut.

Tighten each fastener to the specified torque.

**TORQUES:**
**Shock absorber (upper/lower):**
**44 N·m (4.5 kgf-m, 33 lbf-ft)**
**Shock arm-to-swing arm: 103 N·m (10.5 kgf-m, 76 lbf-ft)**
**Shock link-to-shock arm: 44 N·m (4.5 kgf-m, 33 lbf-ft)**
**Shock link-to-frame: 44 N·m (4.5 kgf-m, 33 lbf-ft)**

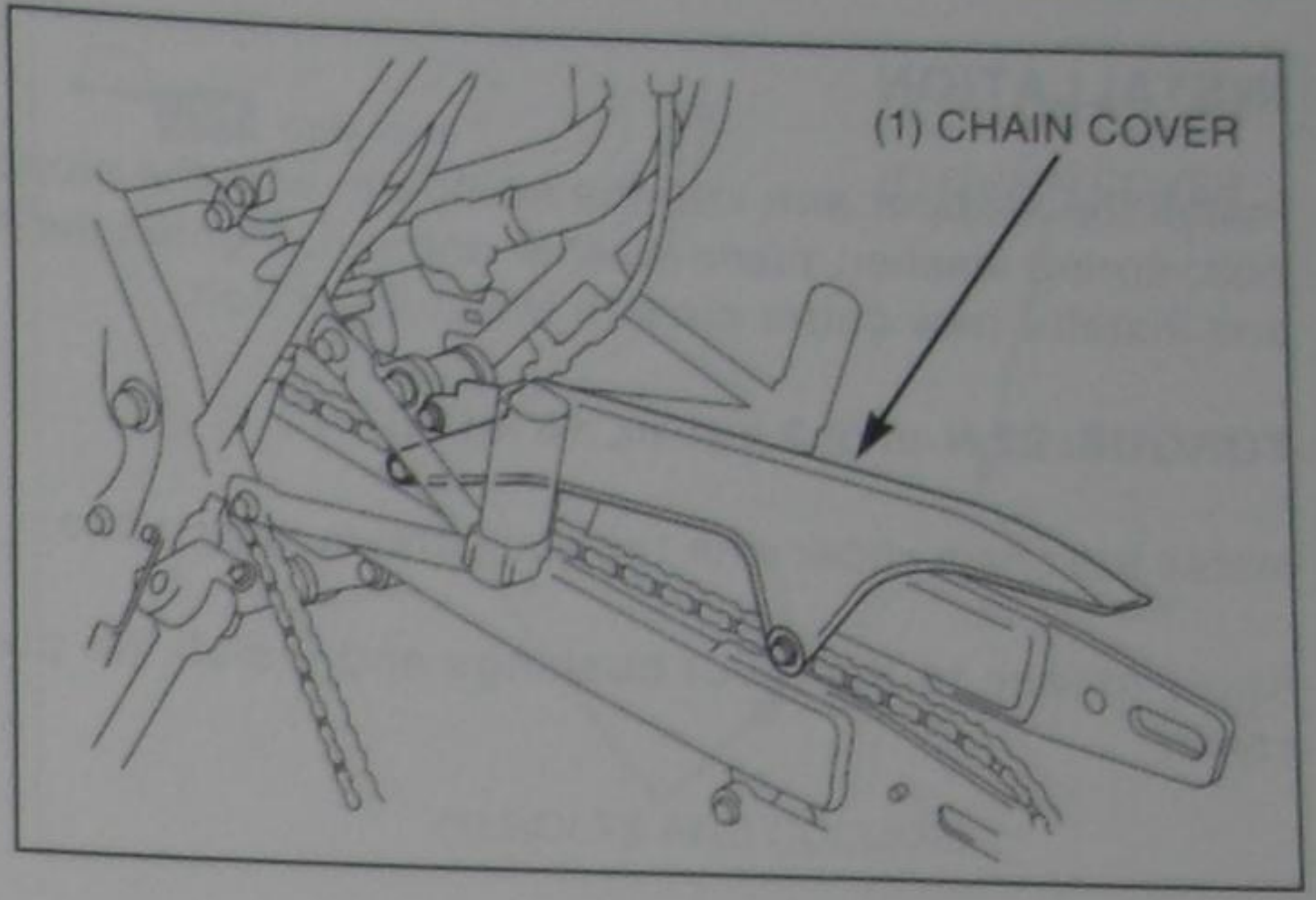
Install the seat (page 2-2).


(1) BOLTS AND NUTS

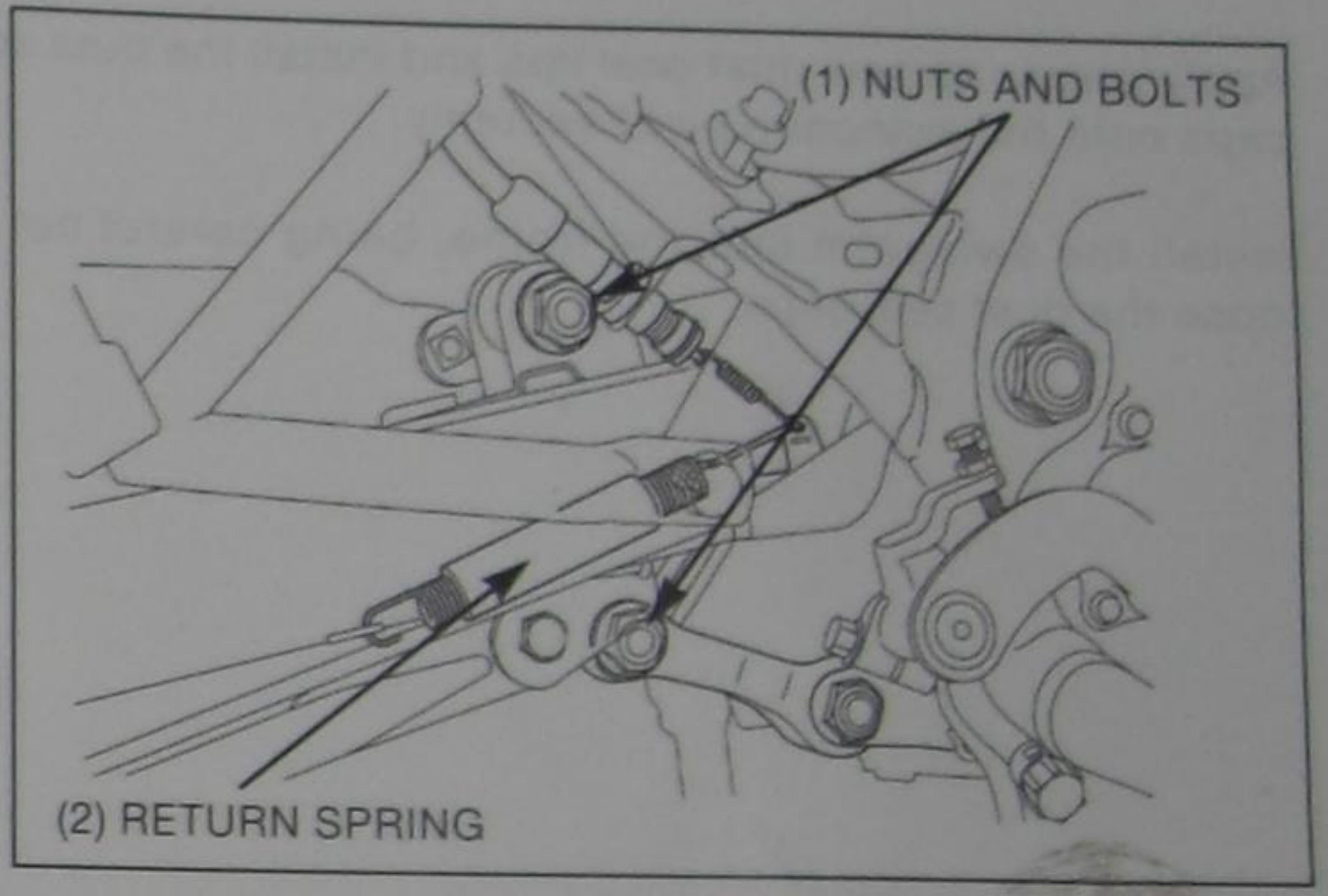
## Swingarm

### REMOVAL

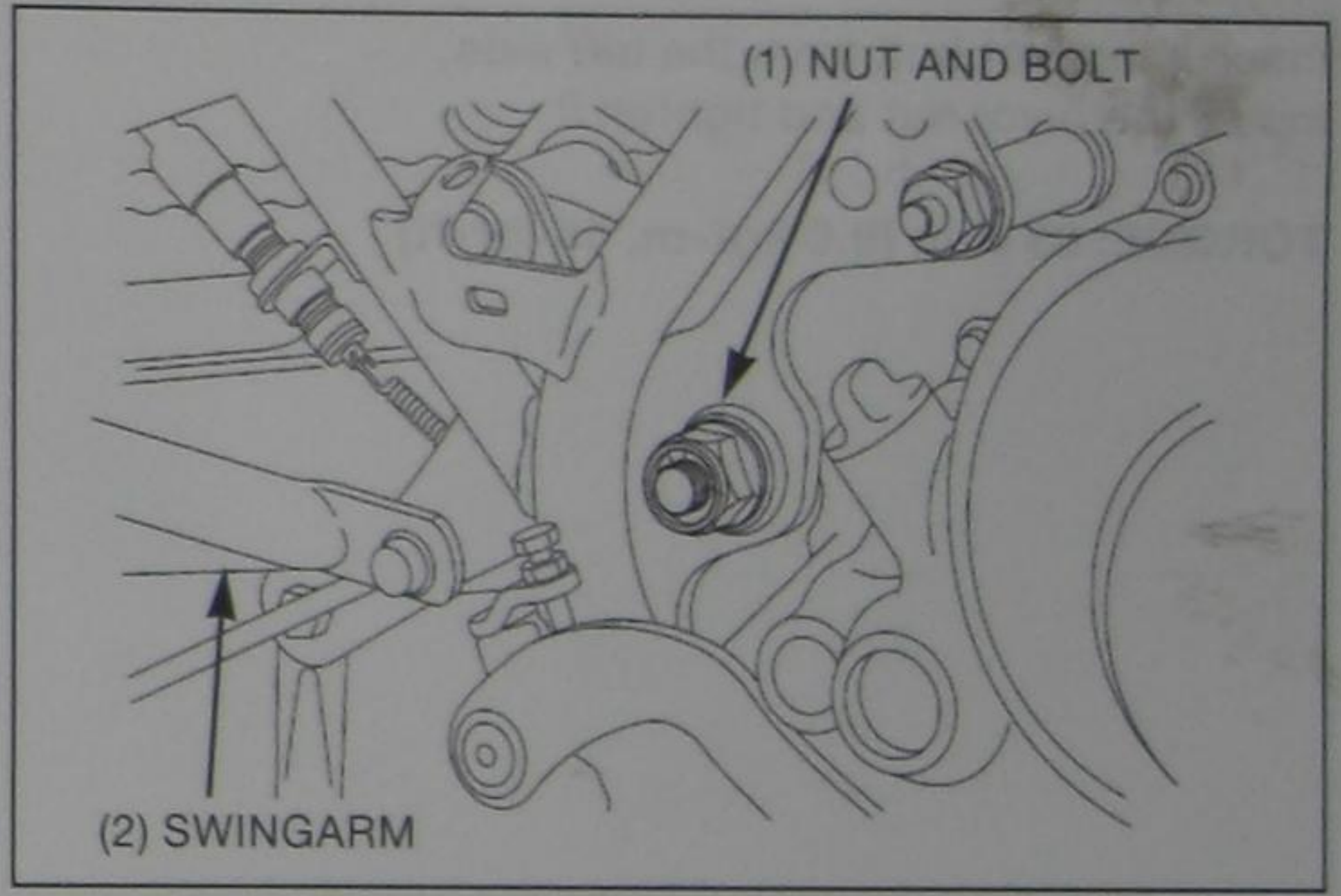
Remove the following:
- Rear wheel (page 13-3)
- Bolts and collars
- Drive chain cover


(1) CHAIN COVER

- Brake pedal return spring
- Shock arm-to-swingarm nut and bolt
- Shock link-to-shock arm nut and bolt


(1) NUTS AND BOLTS
(2) RETURN SPRING

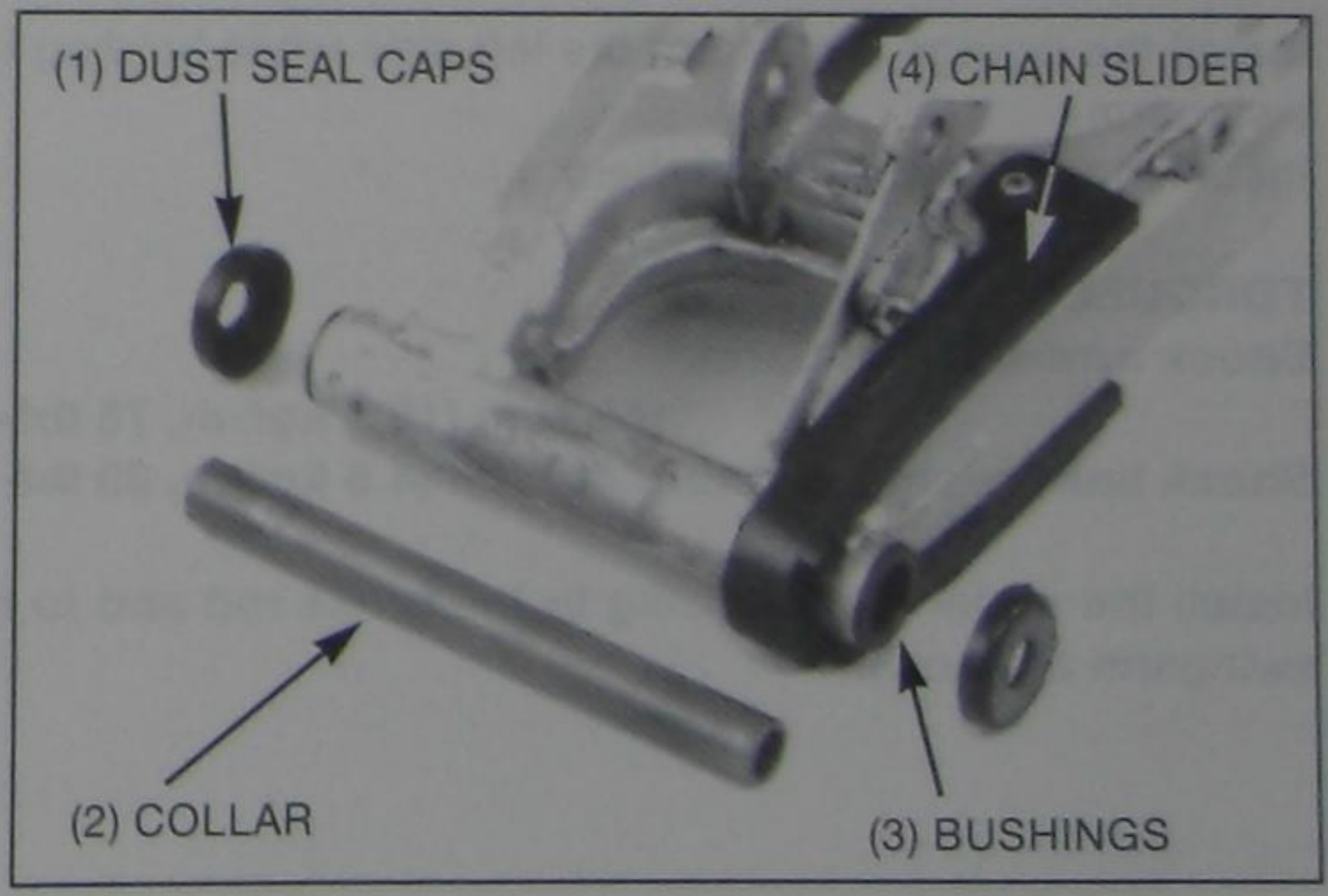
- Swingarm pivot nut and bolt
- Swingarm


(1) NUT AND BOLT
(2) SWINGARM

- Dust seal caps
- Pivot collar
- Two screws, collars and drive chain slider
- Cotter pin, plane washer, spring washer, bolt and stopper arm.

### INSPECTION

Check the swingarm for cracks or other damage.
Check the pivot bushings and collar for wear or damage.


(1) DUST SEAL CAPS
(4) CHAIN SLIDER
(2) COLLAR
(3) BUSHINGS

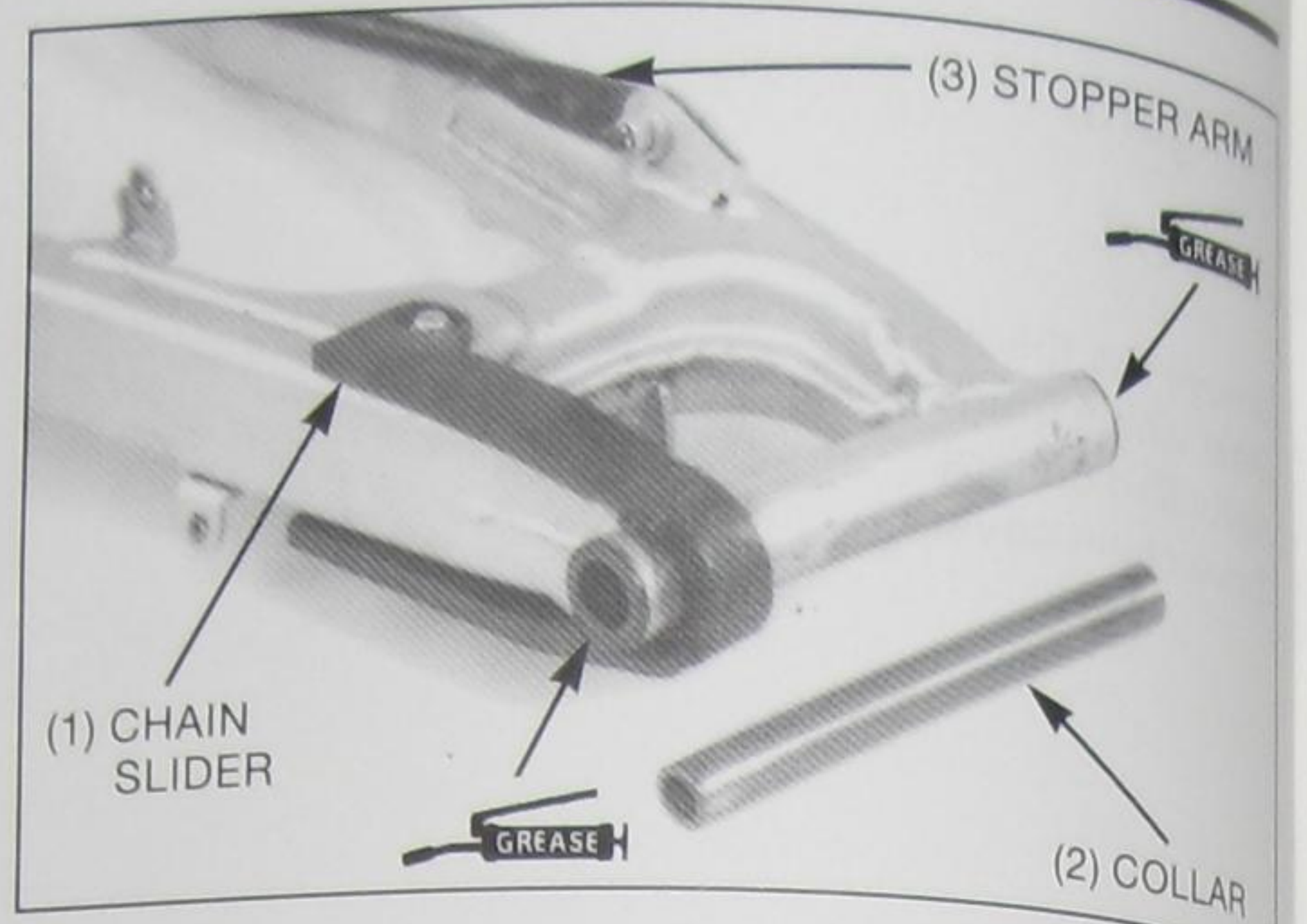
### INSTALLATION

Install the stopper arm into the swingarm with the stopper bolt, spring washer, plane washer and nut. Tighten the nut and install a new cotter pin into the stopper bolt.

**TORQUE: 22 N·m (2.2 kgf-m, 16 lbf-ft)**

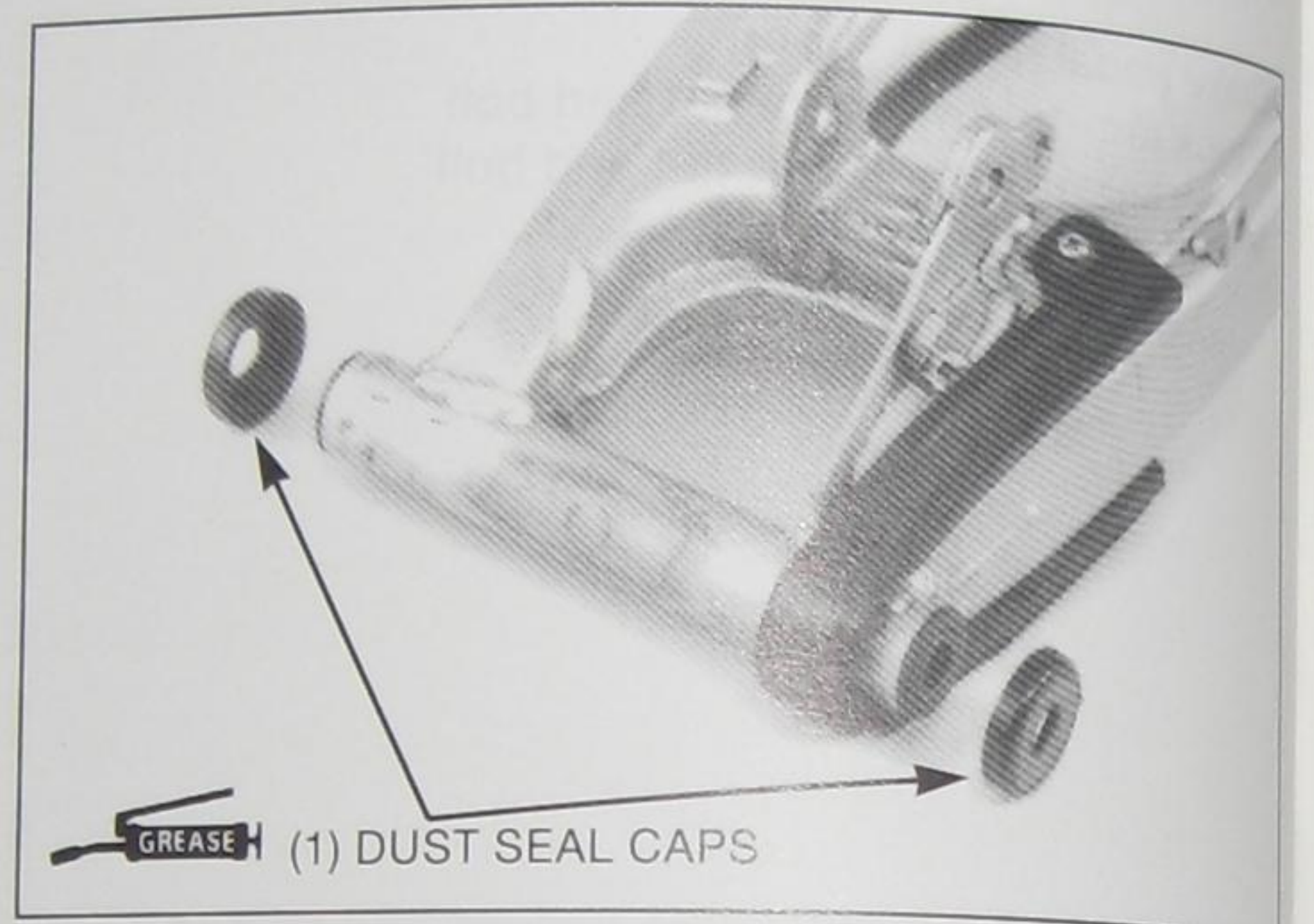
Install the chain slider with the two screws and collars.

Apply grease to the pivot bushings and install the pivot collar.


(3) STOPPER ARM
GREASE
(1) CHAIN SLIDER
GREASE
(2) COLLAR

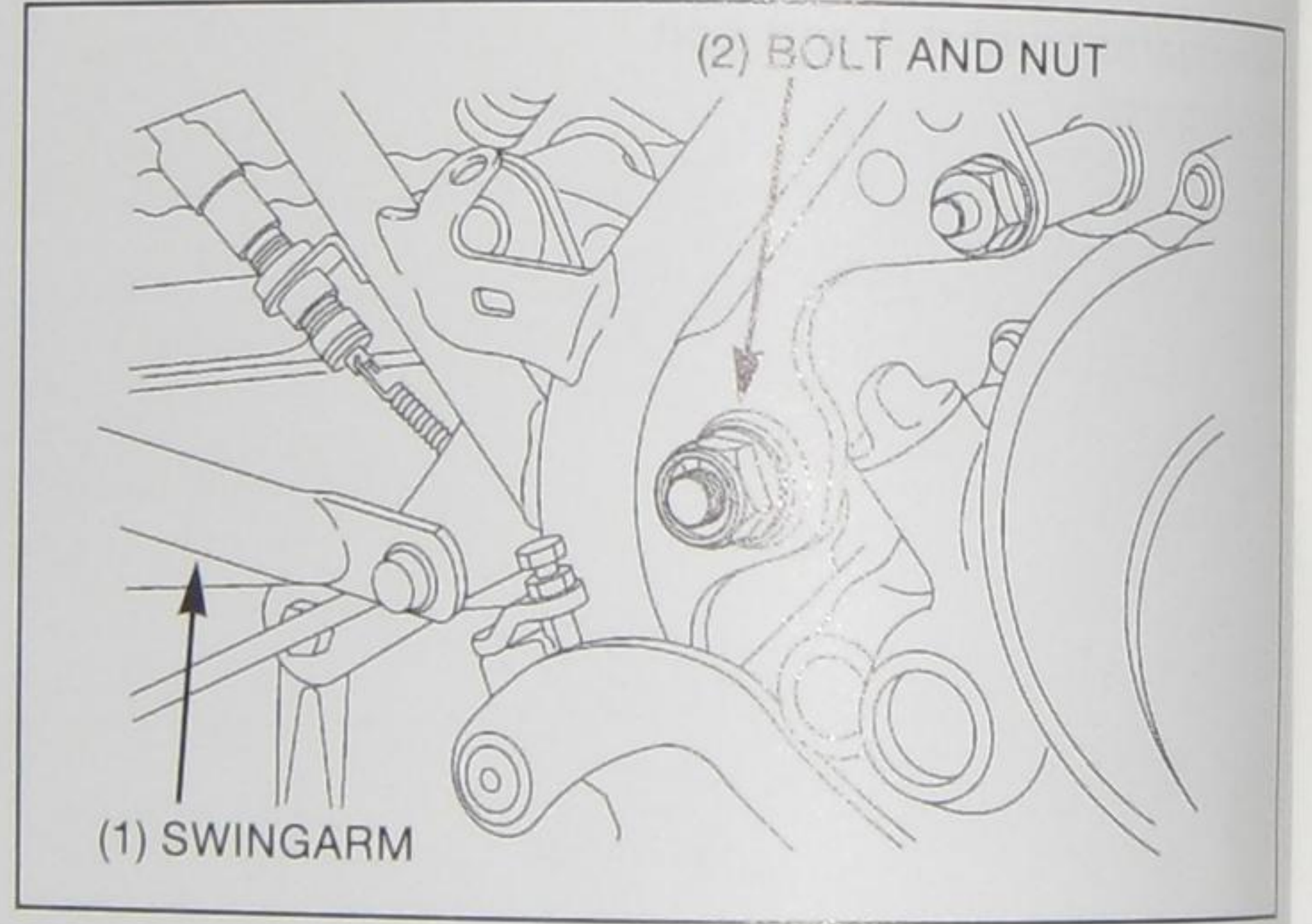
Apply grease to new dust seal lips and install the dust seal caps onto the swingarm pivot securely.

Install the swingarm into the frame, being careful not to loose the dust seal caps.


GREASE
(1) DUST SEAL CAPS

Insert the pivot bolt from the left side.
Install the pivot nut and tighten it.

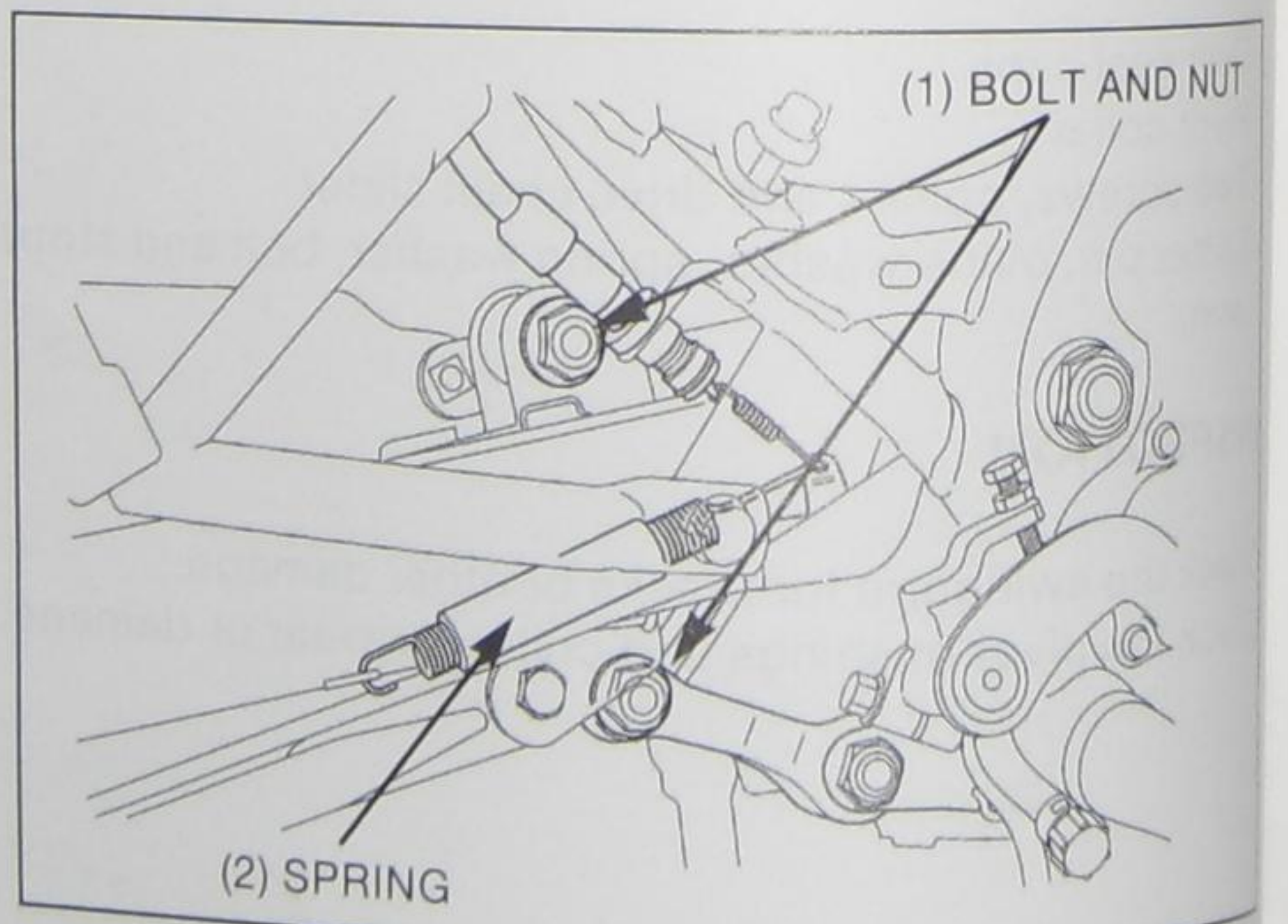
**TORQUE: 88 N·m (9.0 kgf-m, 65 lbf-ft)**


(2) BOLT AND NUT
(1) SWINGARM

Install the linkage bolts from the left side while holding the swingarm.
Install the nuts and tighten them.

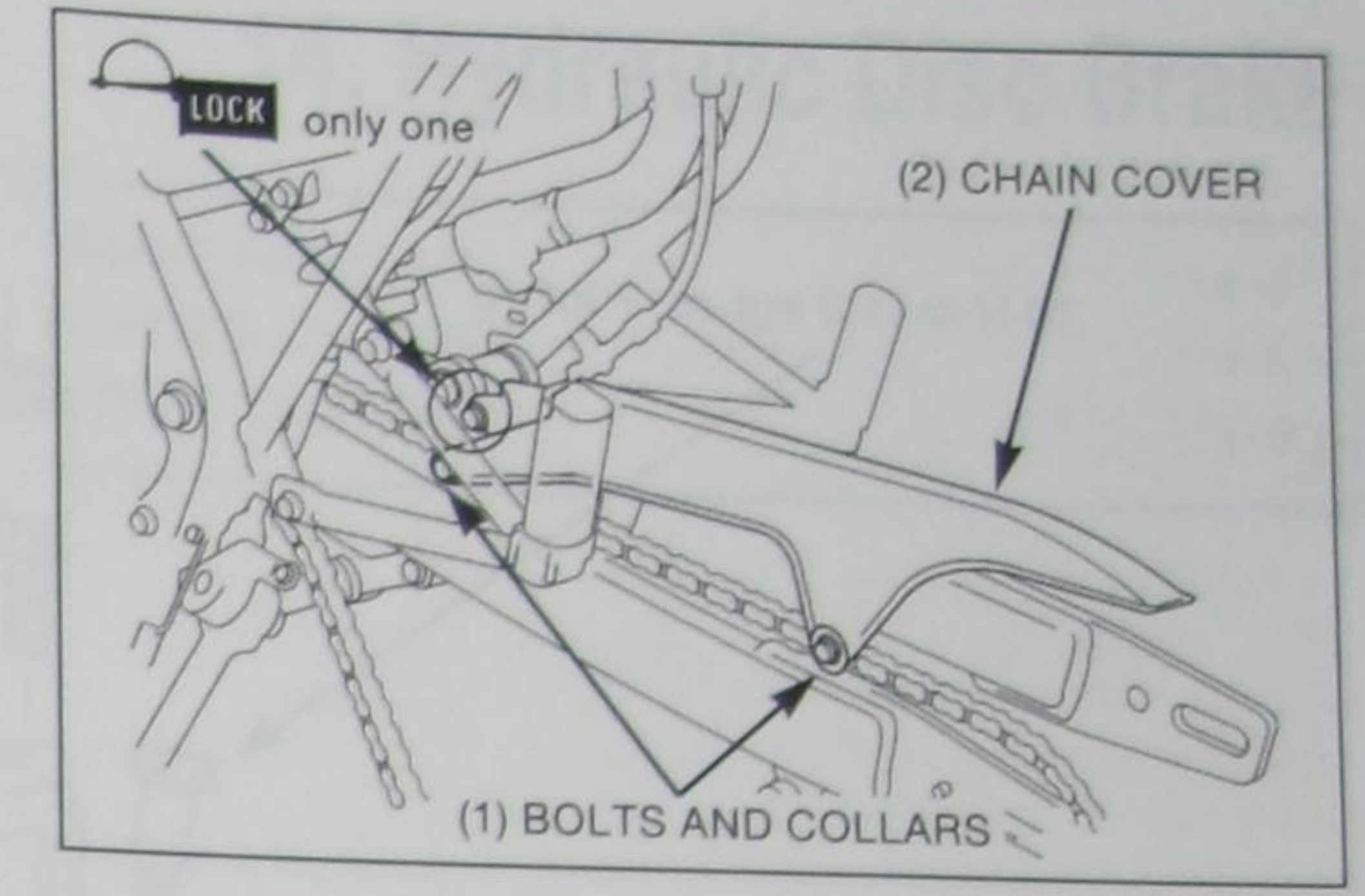
**TORQUES:**
**Shock arm-to-swing arm: 103 N·m (10.5 kgf-m, 76 lbf-ft)**
**Shock link-to-shock arm: 44 N·m (4.5 kgf-m, 33 lbf-ft)**

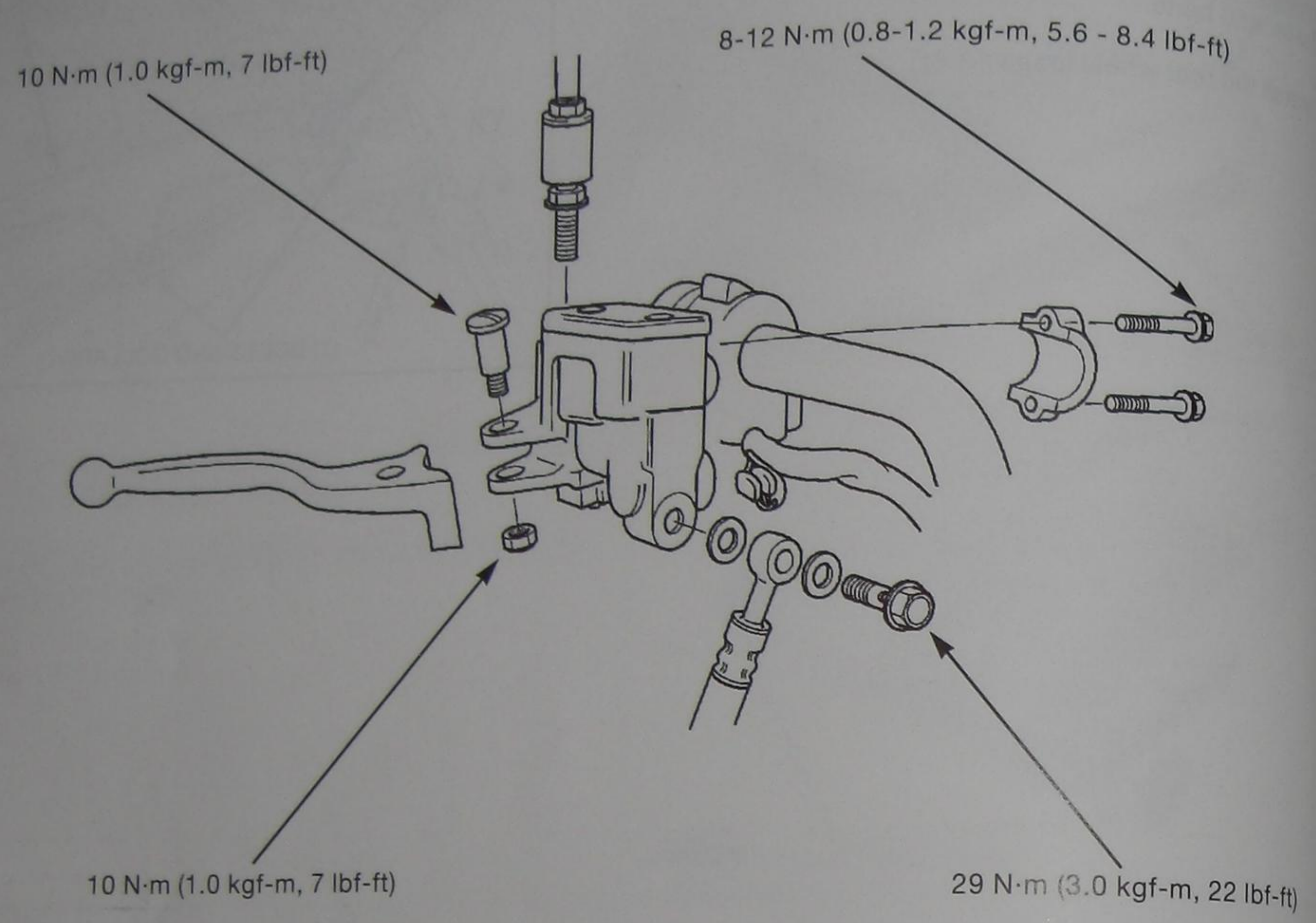
Install the pedal return spring to the brake rod and to the swingarm as shown.

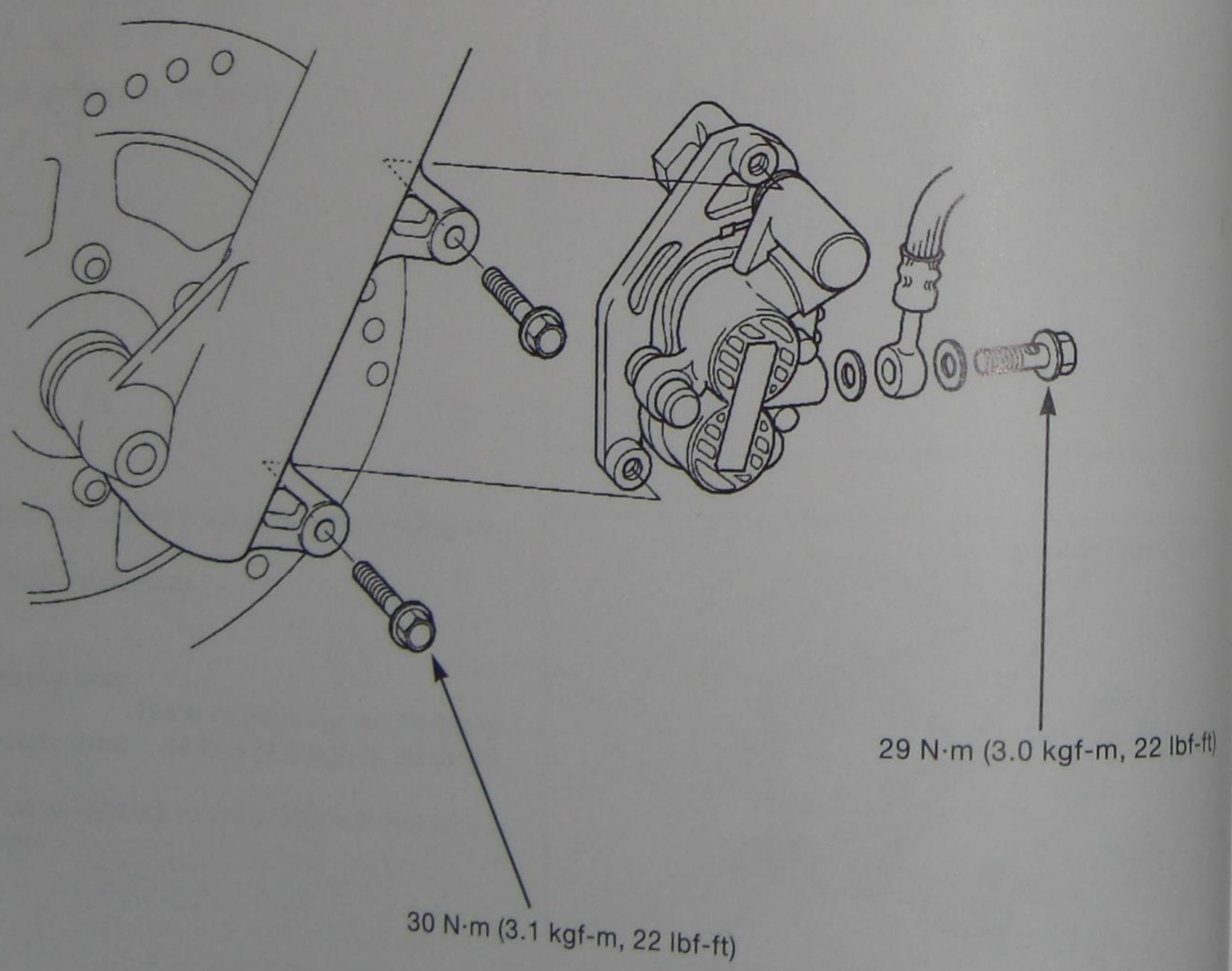

(1) BOLT AND NUT
(2) SPRING

Apply locking agent to the chain cover bolt threads as shown.
Install the drive chain cover onto the swingarm with the collar and bolts.

Install the rear wheel (page 13-6).


LOCK only one
(2) CHAIN COVER
(1) BOLTS AND COLLARS


10 N·m (1.0 kgf-m, 7 lbf-ft)
8-12 N·m (0.8-1.2 kgf-m, 5.6 - 8.4 lbf-ft)
10 N·m (1.0 kgf-m, 7 lbf-ft)
29 N·m (3.0 kgf-m, 22 lbf-ft)



# 14. Hydraulic Disc Brake

| | | | |
|---|---|---|---|
| SERVICE INFORMATION | 14-1 | BRAKE PAD/DISC | 14-4 |
| TROUBLESHOOTING | 14-2 | MASTER CYLINDER | 14-6 |
| BRAKE FLUID REPLACEMENT/AIR BLEEDING | 14-3 | BRAKE CALIPER | 14-9 |

## Service Information

### GENERAL

**⚠ WARNING**

- **A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.**

- Spilled brake fluid will severely damage the plastic parts and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid as they may not to be compatible.
- Always check brake operation before riding the motorcycle.

### SPECIFICATIONS

Unit: mm (in)

| Item | Standard | Service Limit |
|---|---|---|
| Specified brake fluid | DOT 4 | — |
| Brake disc thickness | 3.8-4.2 (0.15-0.17) | 3.5 (0.14) |
| Brake disc runout | — | 0.30 (0.012) |
| Master cylinder I.D. | 12.700-12.743 (0.5000-0.5017) | 12.75 (0.502) |
| Master cylinder piston O.D. | 12.657-12.684 (0.4983-0.4994) | 12.65 (0.498) |
| Caliper cylinder I.D. | 25.020-25.050 (0.9851-0.9862) | 25.06 (0.987) |
| Caliper piston O.D. | 24.960-24.980 (0.9827-0.9835) | 24.95 (0.982) |

### TORQUE VALUES

| | | |
|---|---|---|
| Brake caliper bleed valve | 6 N·m (0.6 kgf-m, 4.3 lbf-ft) | |
| Master cylinder reservoir cap screw | 2 N·m (0.2 kgf-m, 1.4 lbf-ft) | |
| Brake caliper mounting bolt | 30 N·m (3.1 kgf-m, 22 lbf-ft) | ALOC bolt: replace with a new one |
| Pad pin retainer plate bolt | 10 N·m (1.0 kgf-m, 7 lbf-ft) | |
| Brake hose oil bolt | 29 N·m (3.0 kgf-m, 22 lbf-ft) | |
| Front brake lever pivot nut | 10 N·m (1.0 kgf-m, 7 lbf-ft) | |
| bolt | 10 N·m (1.0 kgf-m, 7 lbf-ft) | |
| Front brake light switch screw | 1 N·m (0.1 kgf-m, 0.7 lbf-ft) | |
| Brake caliper pin bolt | 23 N·m (2.3 kgf-m, 17 lbf-ft) | Apply locking agent to the threads |
| Brake caliper pin bolt nut | 23 N·m (2.3 kgf-m, 17 lbf-ft) | Apply locking agent to the threads |
| Brake caliper assembly bolt | 54 N·m (5.5 kgf-m, 40 lbf-ft) | |
| Master cylinder holder bolt | 8-12 N·m (0.8 - 1.2 kgf-m, 5.6 - 8.4 lbf-ft) | |

### TOOL

| | |
|---|---|
| Snap ring pliers | 07914-SA50001 |

## Troubleshooting

**Brake lever soft or spongy**
- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seals
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Contaminated master cylinder
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master piston
- Bent brake lever

**Brake lever hard**
- Clogged/restricted hydraulic system
- Sticking/worn caliper piston
- Sticking/worn master piston
- Caliper not sliding properly
- Bent brake lever

**Brake drag**
- Contaminated brake pad/disc
- Misaligned wheel
- Badly worn brake pad/disc
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Sticking caliper piston

## Brake Fluid Replacement/Air Bleeding

**⚠ WARNING**

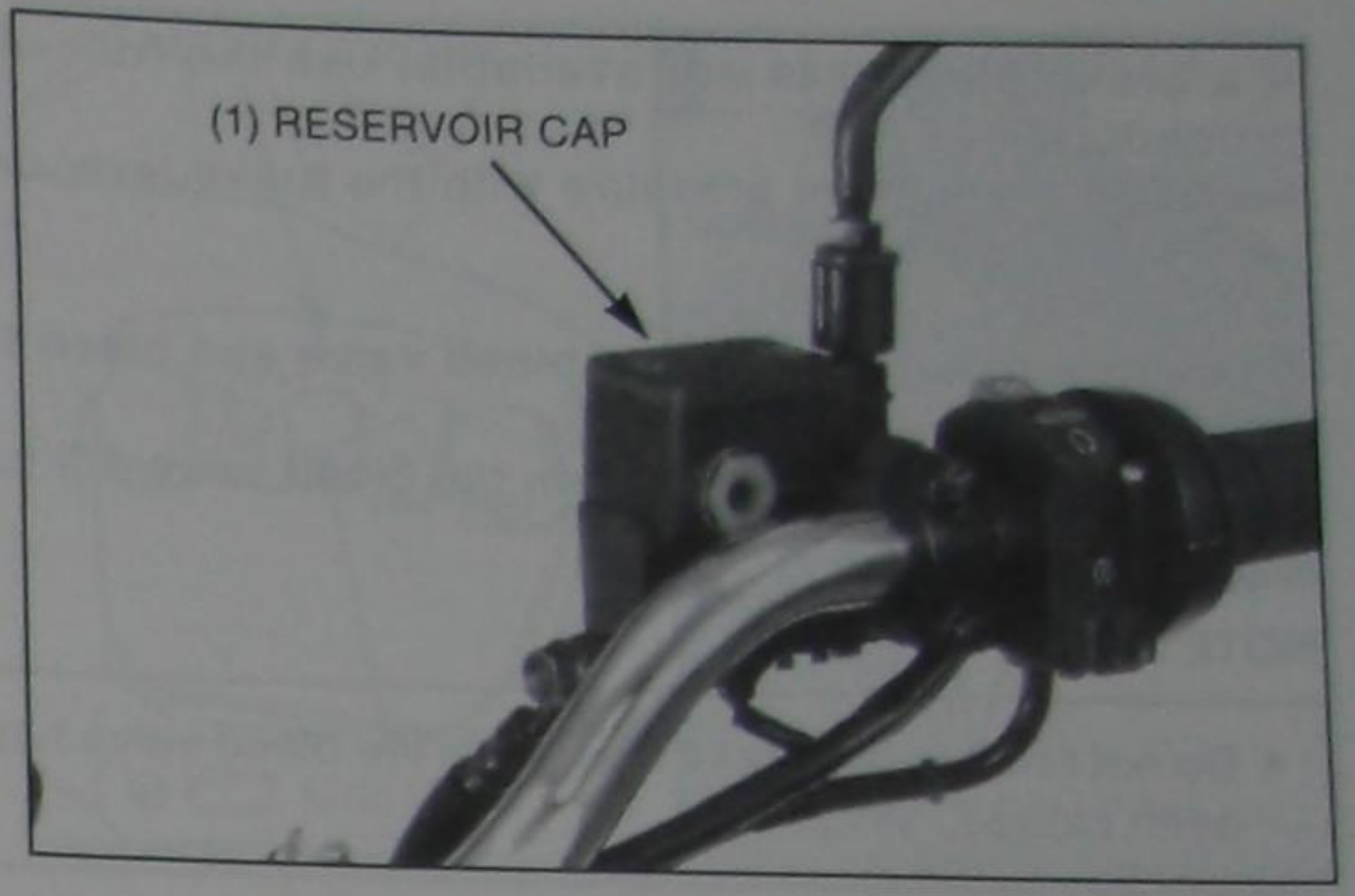
- **A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.**

**CAUTION**

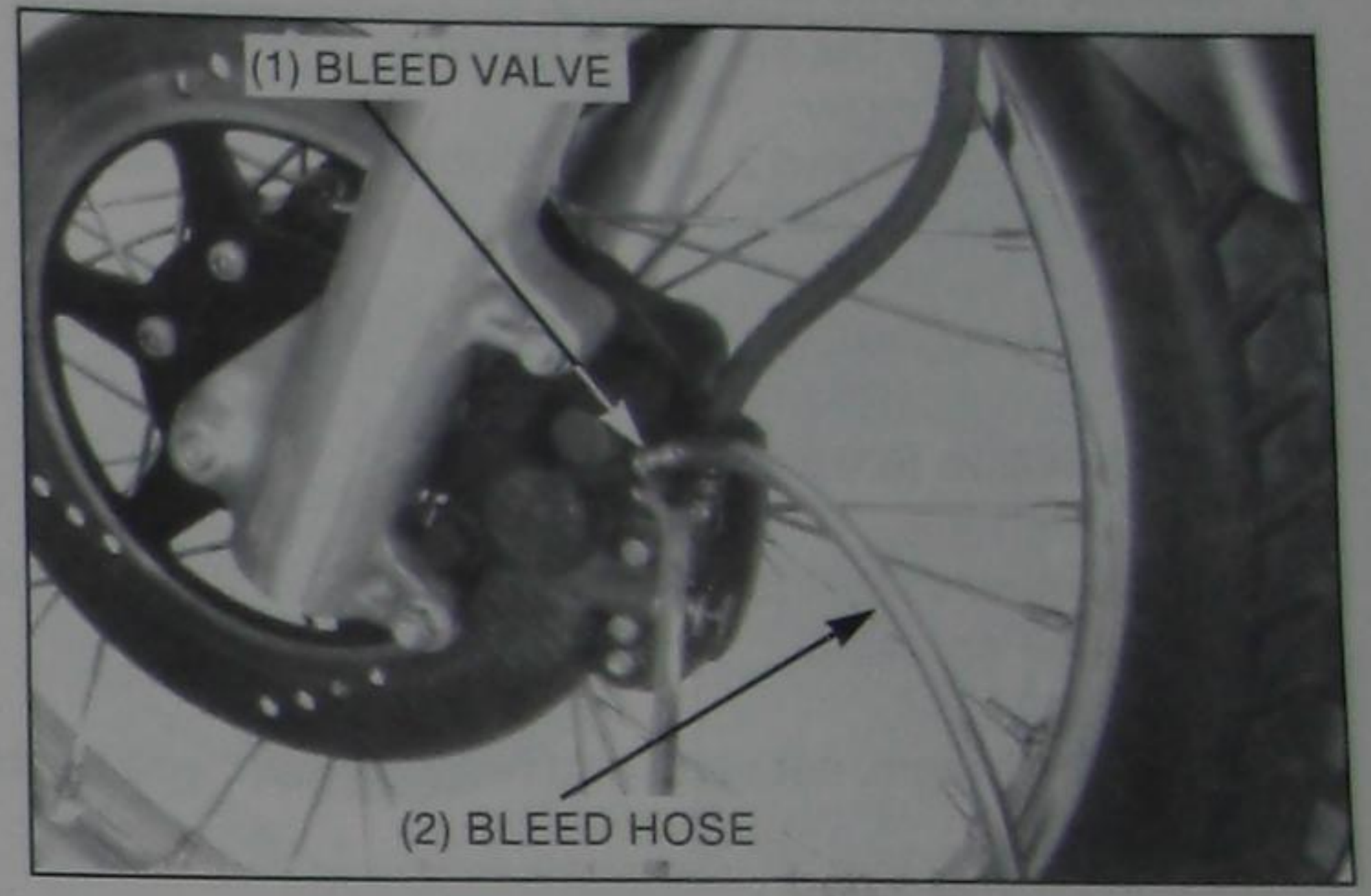
- **Do not allow foreign material to enter the system when filling the reservoir.**
- **Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.**
- **Use only DOT 4 brake fluid from a sealed container.**
- **Do not mix different types of fluid. They are not compatible.**

### BRAKE FLUID DRAINING

Turn the handlebar so that the reservoir is level and remove the two screws, reservoir cap, set plate and diaphragm.



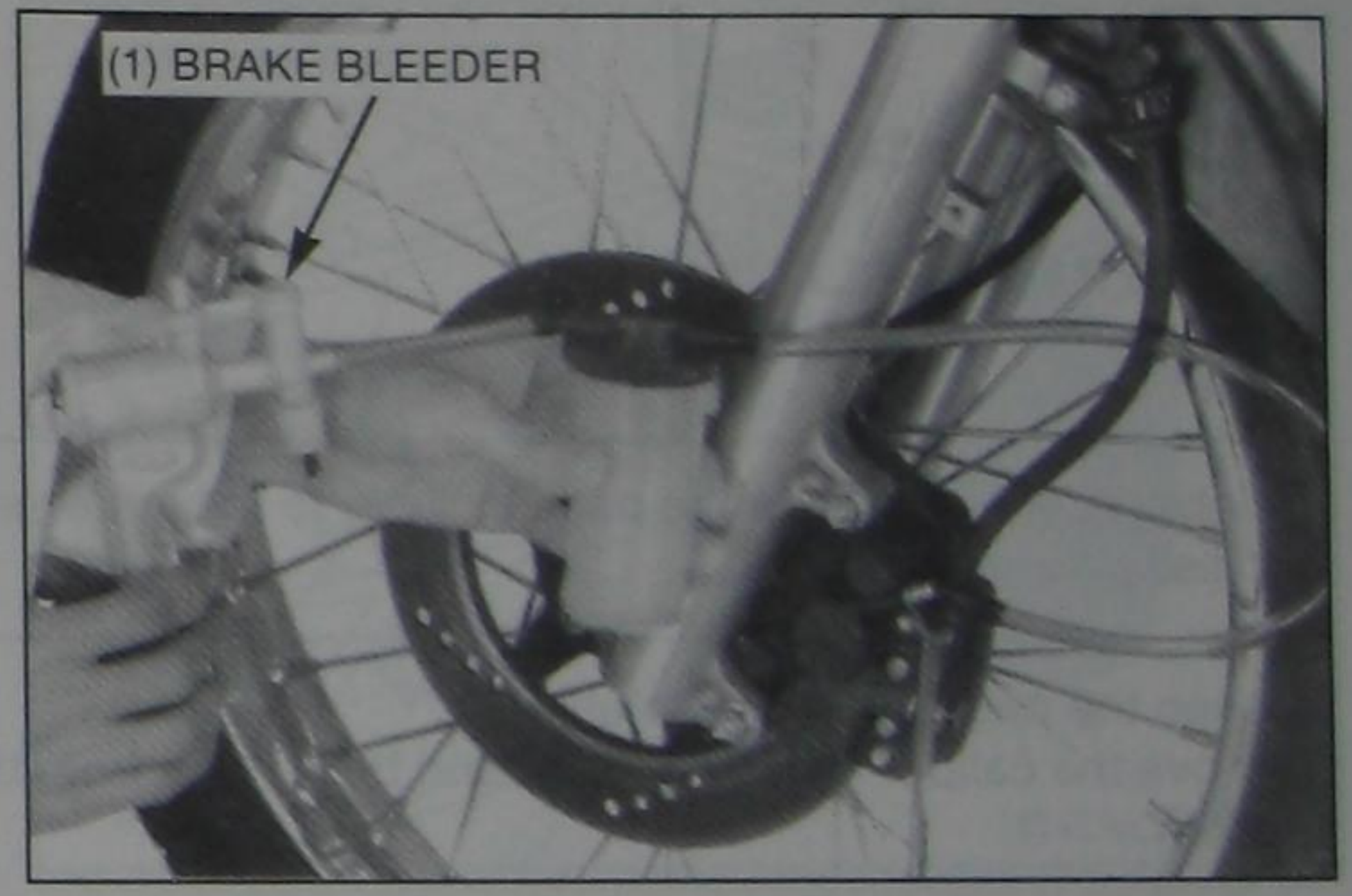
Connect the bleed hose to the bleed valve.
Loosen the bleed valve and pump the brake lever until no more fluid flows out of the bleed valve.



### BRAKE FLUID FILLING/BLEEDING

Close the bleed valve.
Fill the reservoir with DOT 4 brake fluid from a sealed container.

Connect a commercially available brake bleeder to the bleed valve.
Pump the brake bleeder and loosen the bleed valve.
Add brake fluid when the fluid level in the reservoir is low.



NOTE:

- Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instruction.

Repeat the above procedures until air bubbles do not appear in the plastic hose.

NOTE:

- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Close the bleed valve and operate the brake lever. If it still feels spongy, bleed the system again.

If a brake bleeder is not available, use the following procedure:
Pump up the system pressure with the brake lever until lever resistance is felt.

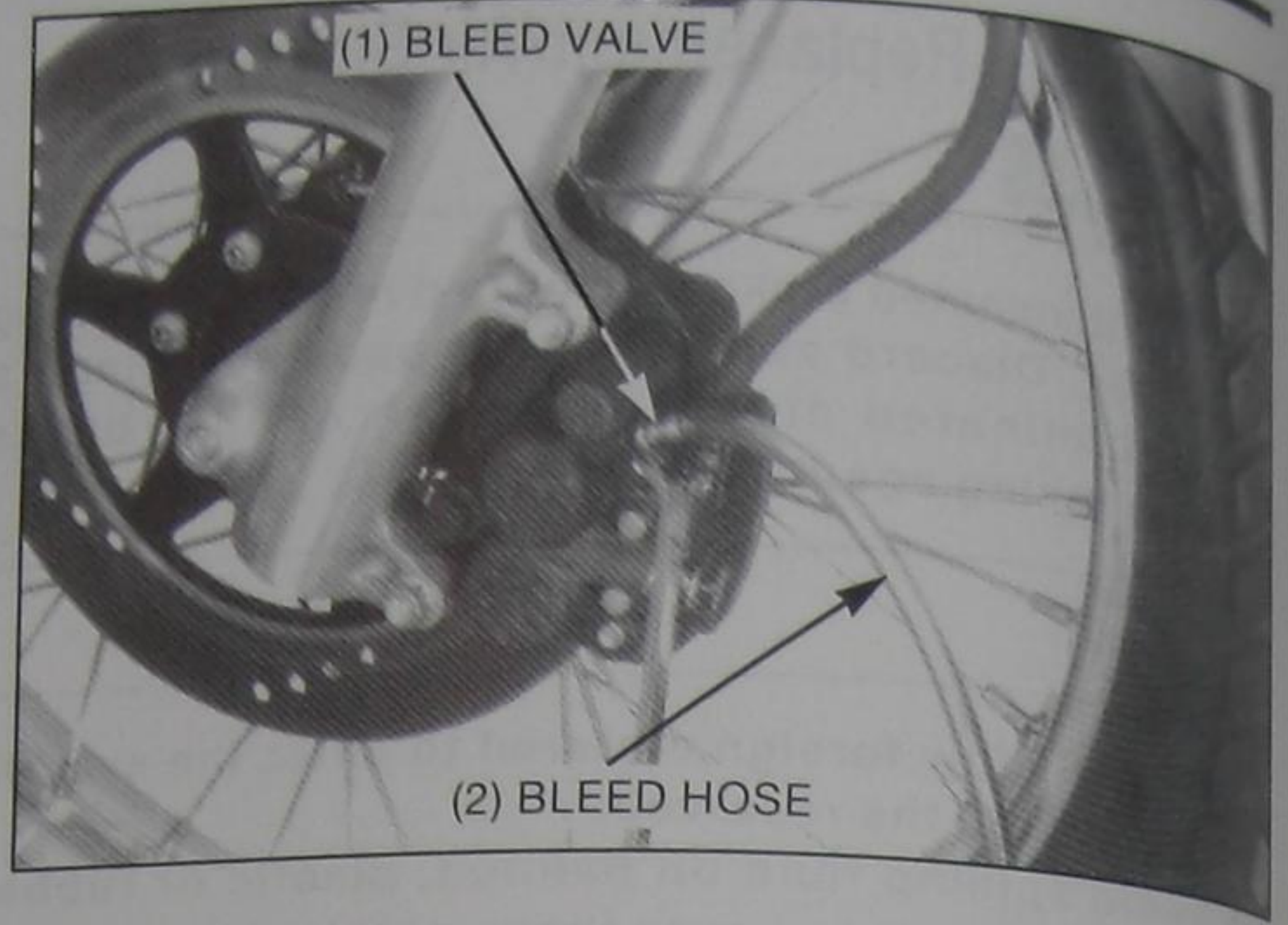
Connect a bleed hose to the bleed valve and bleed the system as follows:

1. Squeeze the brake lever, open the bleed valve 1/2 turn and then close it.

NOTE:

- Do not release the brake lever until the bleed valve has been closed.

2. Release the brake lever slowly and wait several seconds after it reaches the end of its travel.



Repeat the steps 1 and 2 until air bubbles do not appear in the bleed hose.

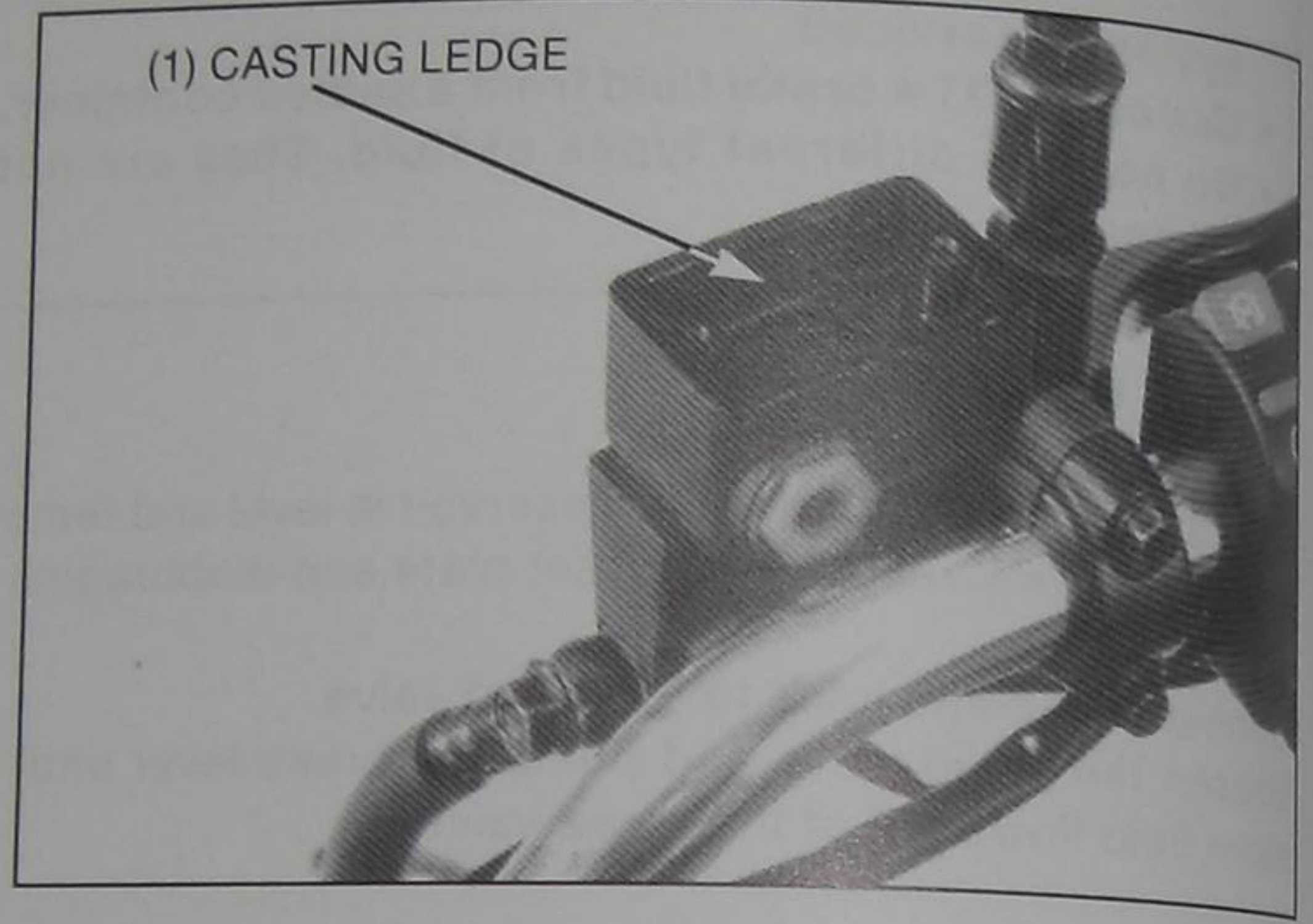
Tighten the bleed valve.

**TORQUE: 6 N·m (0.6 kgf-m, 4.3 lbf-ft)**

Fill the reservoir to the casting ledge with DOT 4 brake fluid from a sealed container.

Install the diaphragm, set plate and reservoir cap, and tighten the two screws.

**TORQUE: 2 N·m (0.2 kgf-m, 1.4 lbf-ft)**



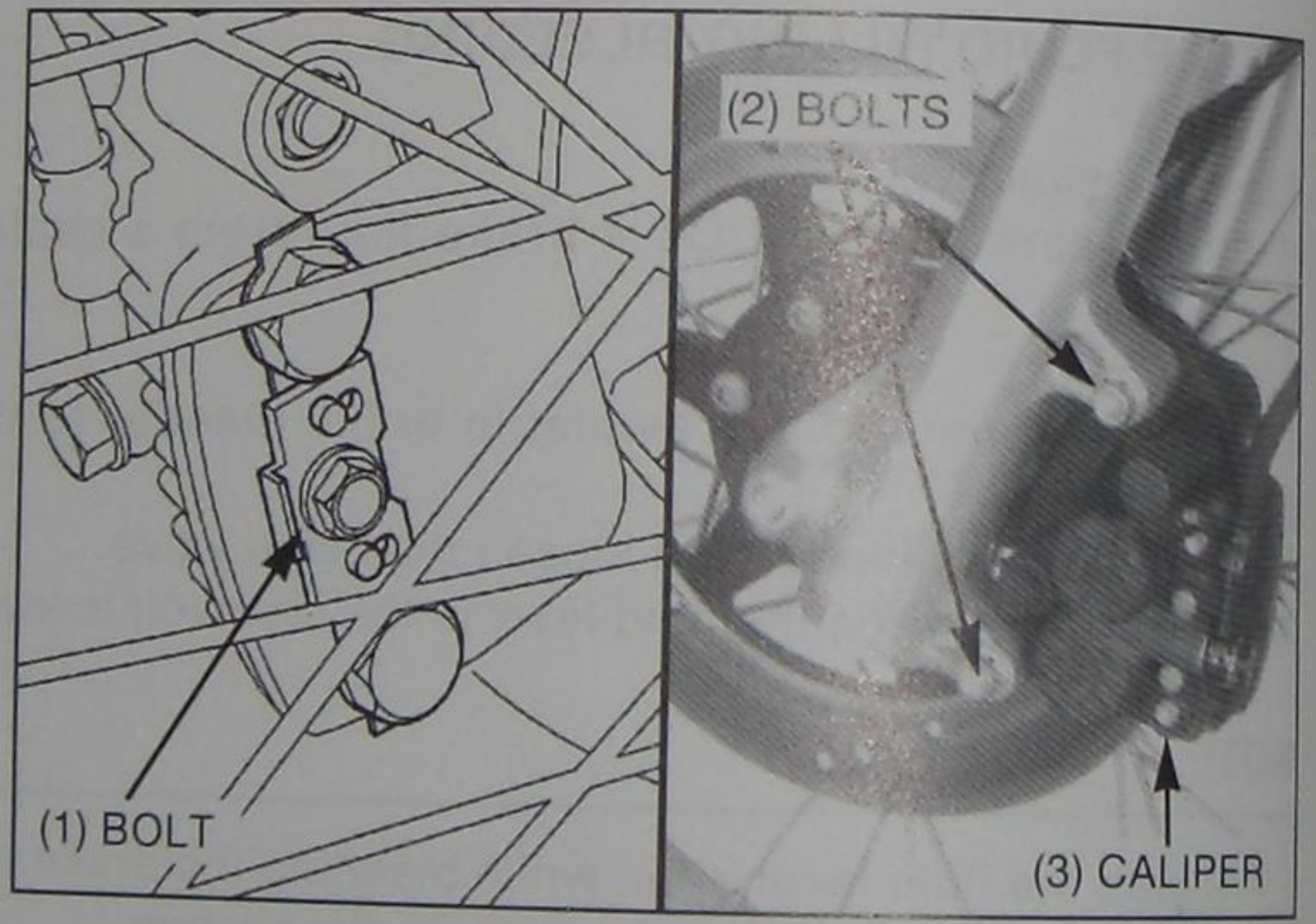
## Brake Pad/Disc

### BRAKE PAD REPLACEMENT

NOTE:

- Always replace the brake pads in pairs to ensure even disc pressure.

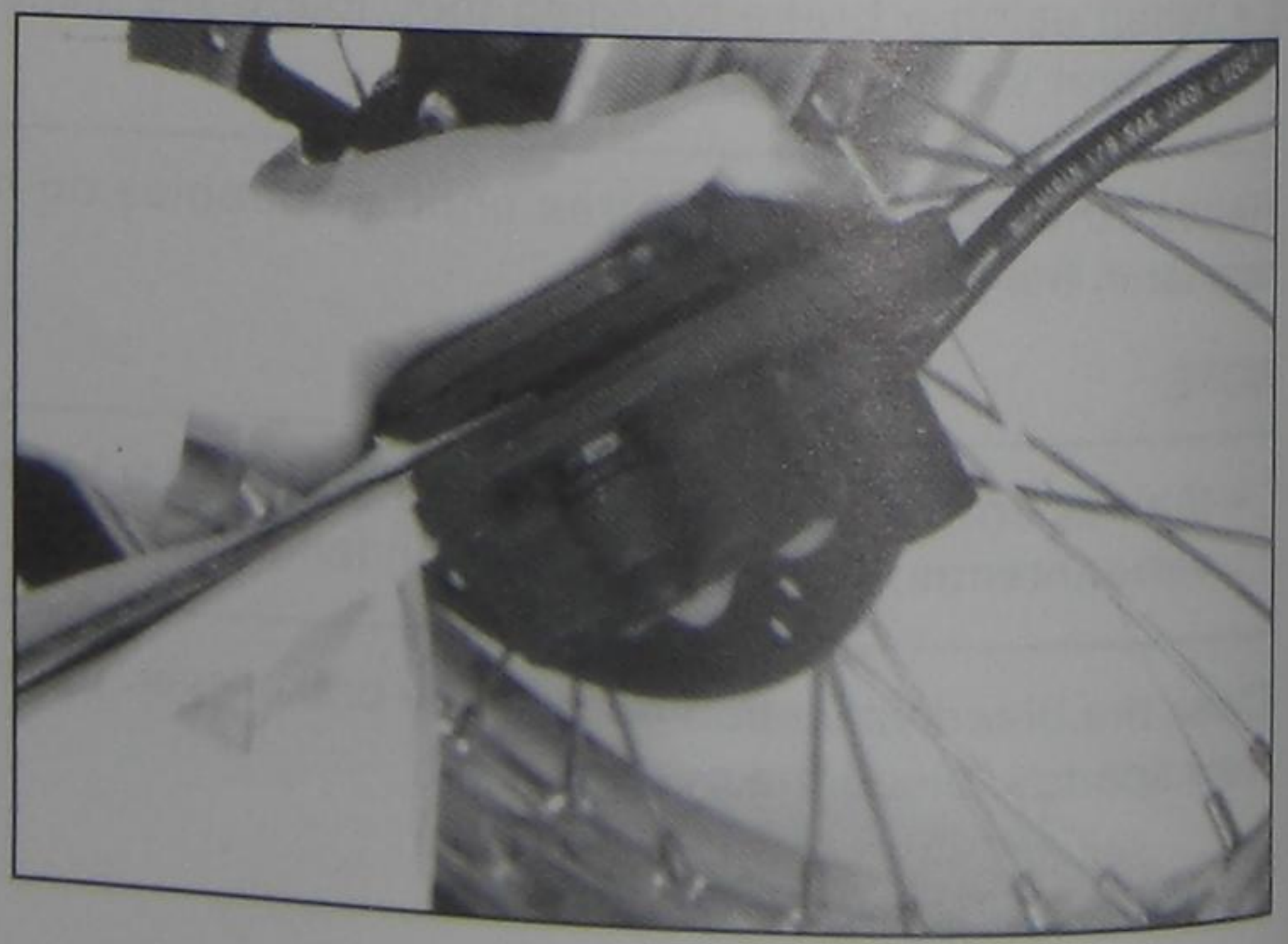
Loosen the pad pin retainer plate bolt.
Remove the caliper mounting bolts and the caliper from the fork leg.



Push the caliper pistons all the way in to allow installation of new brake pads.

NOTE:

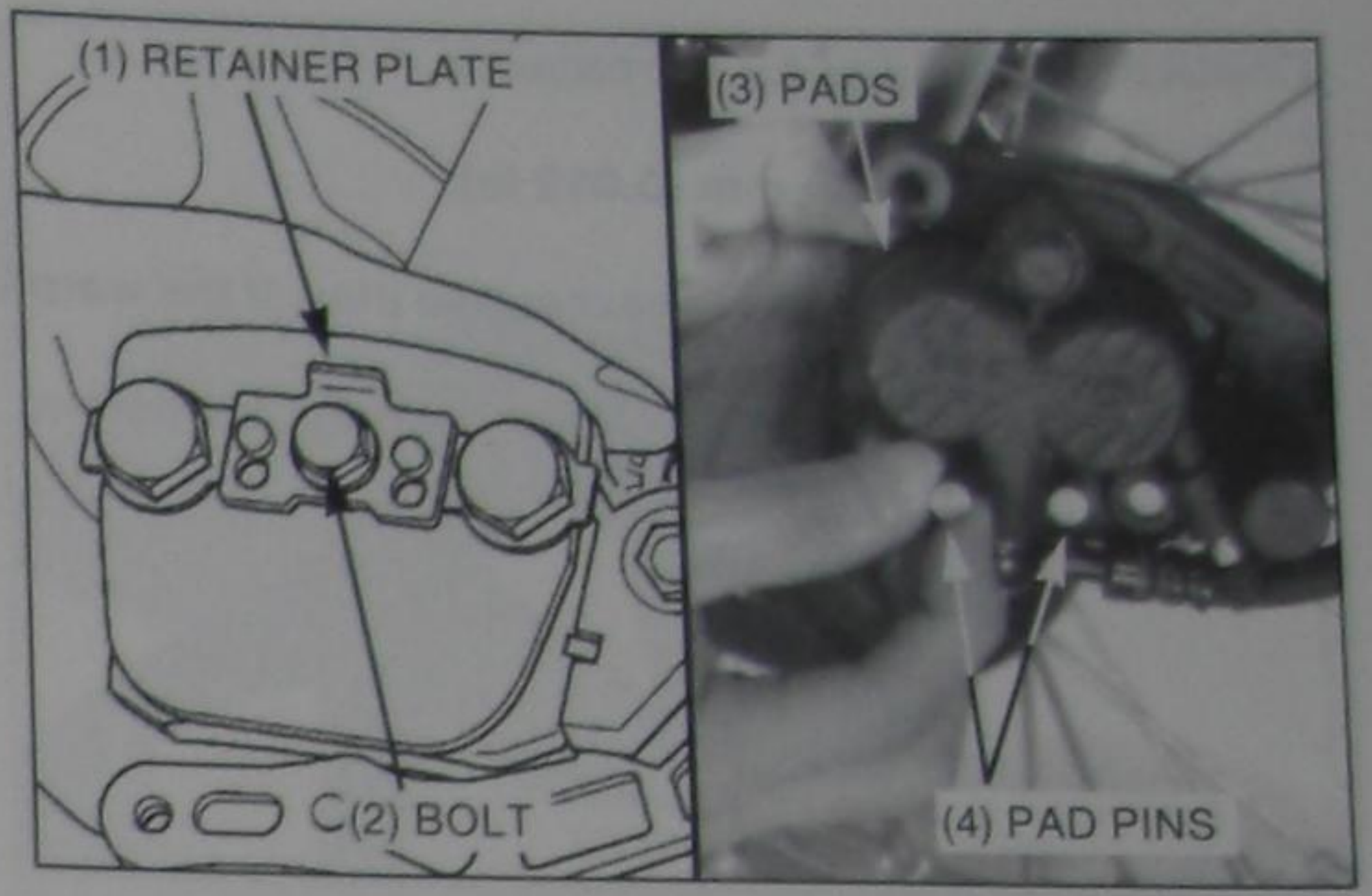
- Check the brake fluid level in the brake reservoir as this operation causes the level to rise.



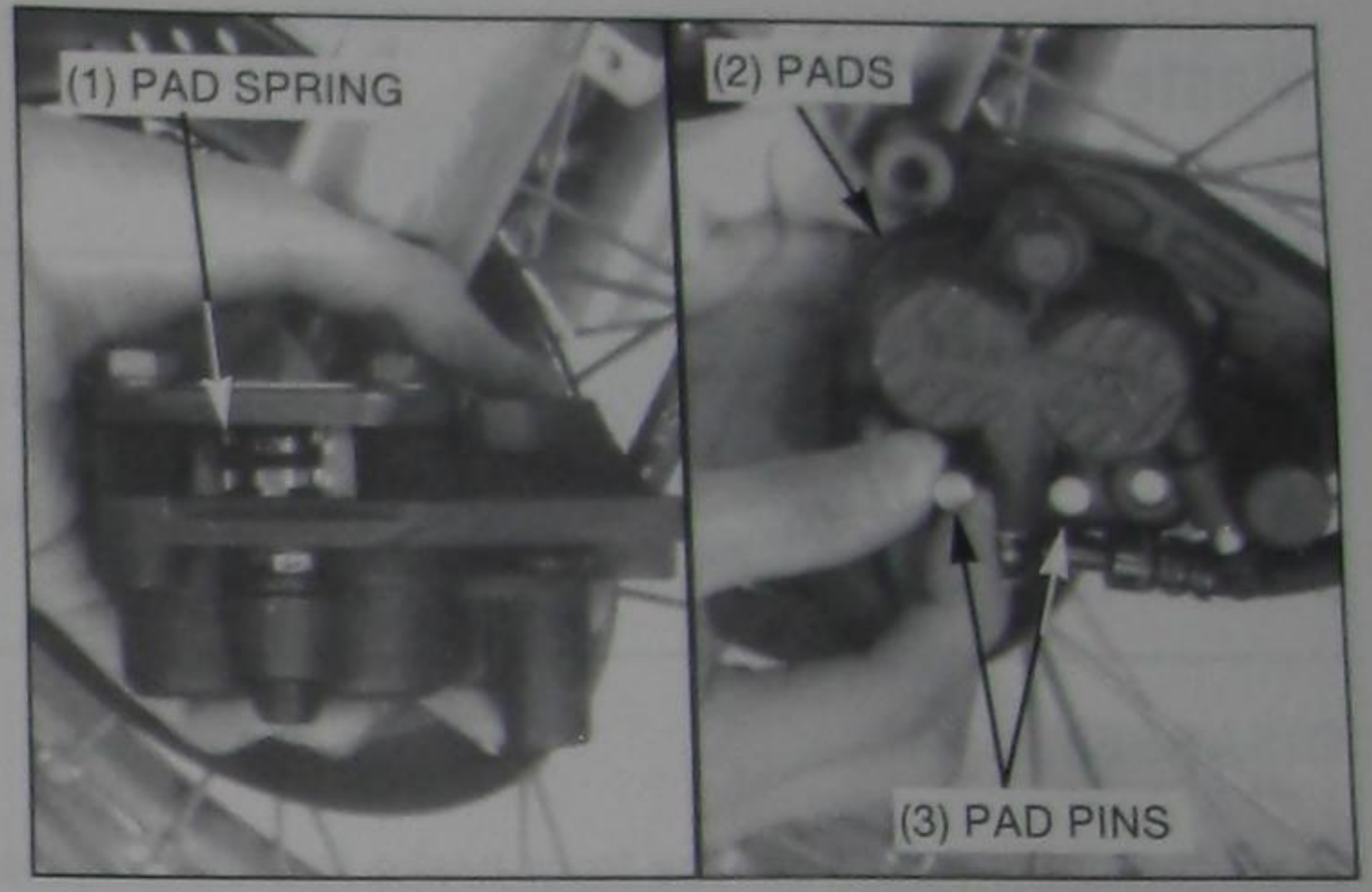
Remove the retainer plate bolt.
Slide the retainer plate to remove it from the pad pins.

Pull the pad pins out of the caliper body while pushing in the pads against the pad spring.
Remove the brake pads.

Clean the caliper body.



Make sure that the pad spring is in position as shown.
Install new brake pads into the caliper body.
Install the pad pins by pushing in the pads against the pad spring to align the pad pin holes in the pads and caliper body.



Set the retainer plate to the pad pin grooves with the tab facing rearwad and install the plate bolt.

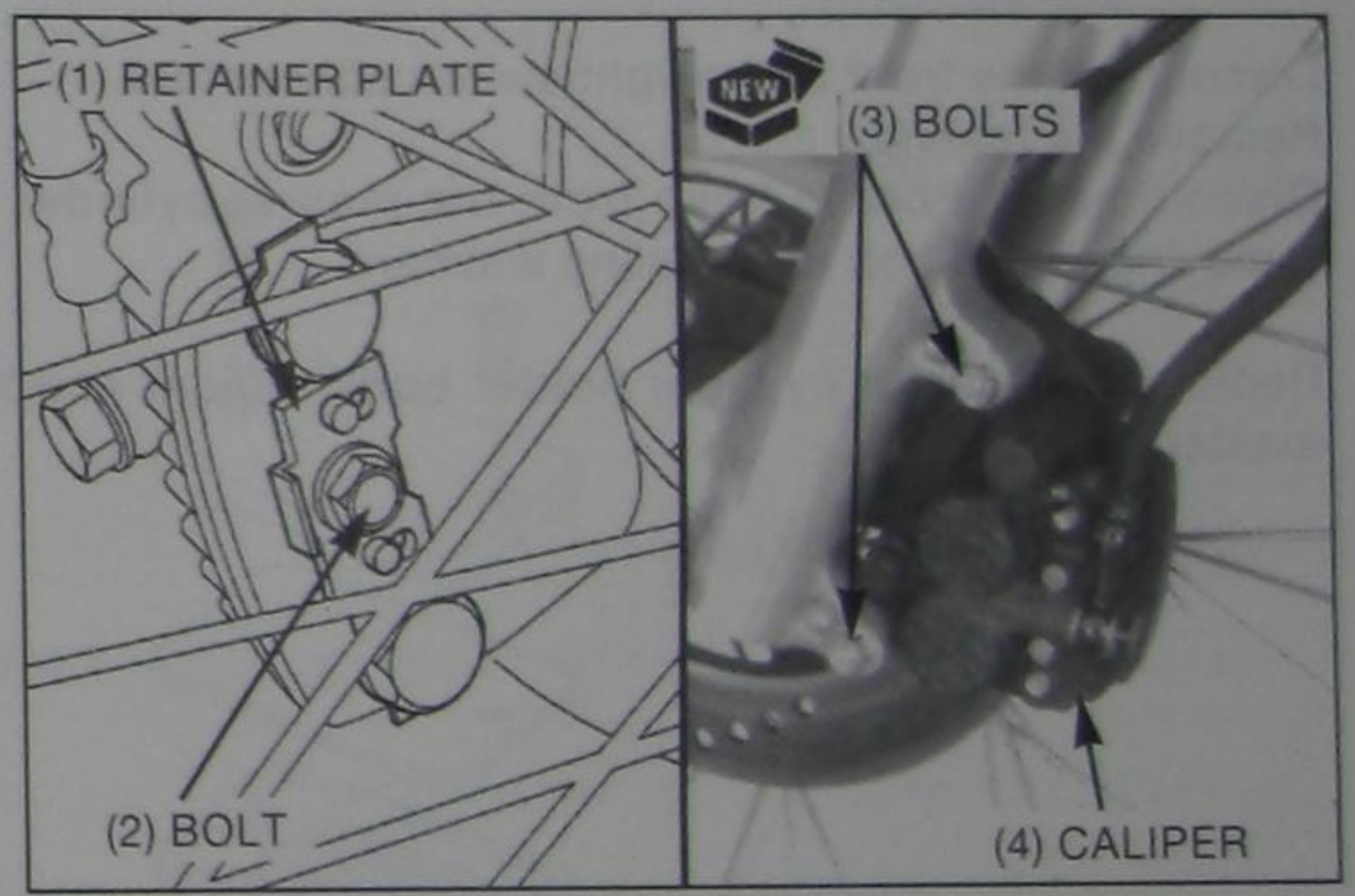
Install the brake caliper onto the fork leg with new mounting bolts.
Tighten the mounting bolts.

**TORQUE: 30 N·m (3.1 kgf-m, 22 lbf-ft)**

Tighten teh retainer plate bolt.

**TORQUE: 10 N·m (1.0 kgf-m, 7 lbf-ft)**

Operate the brake lever to seat the caliper pistons against the pads.

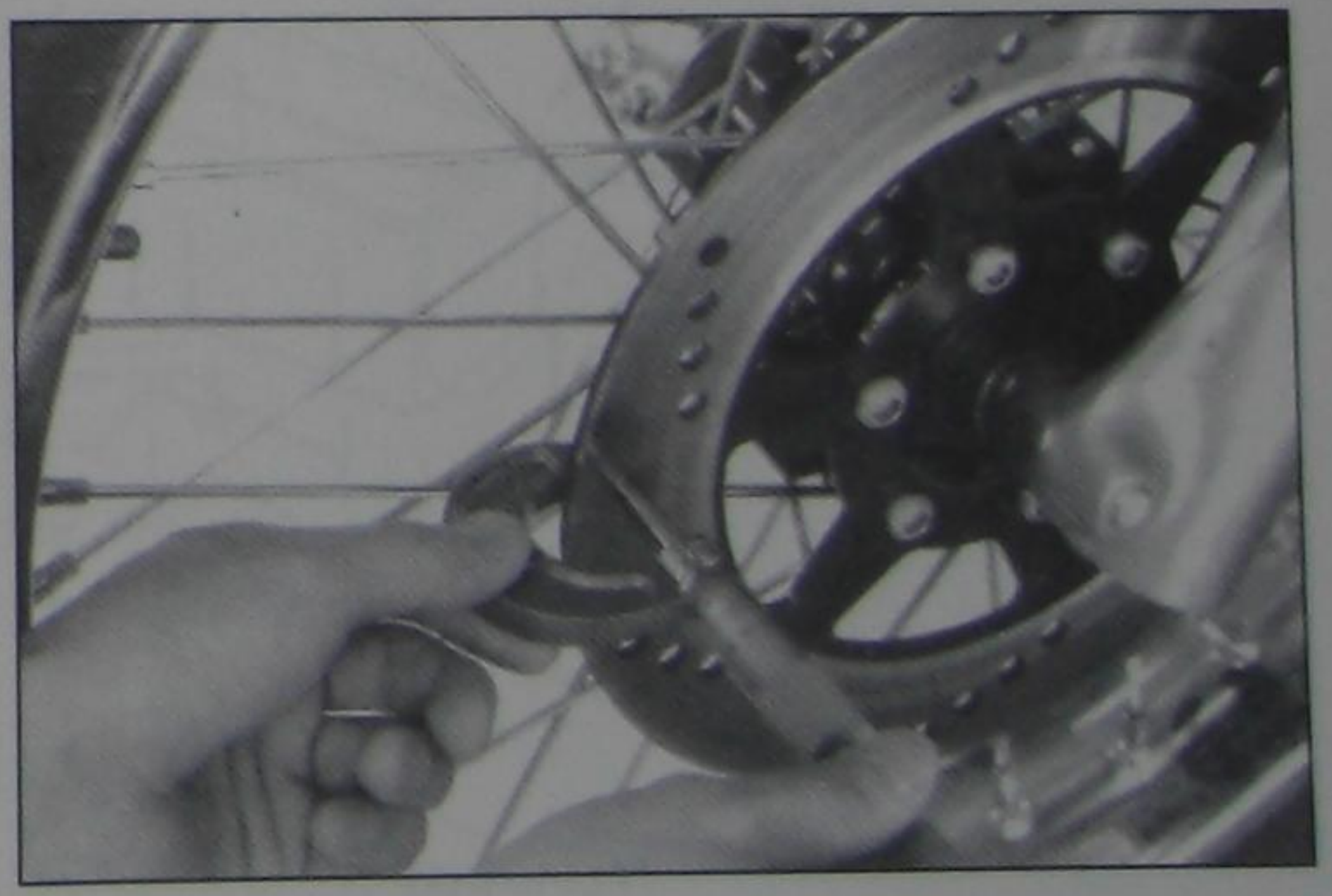


### BRAKE DISC INSPECTION

Visually inspect the disc for damage or cracks.
Measure the brake disc thickness at several points.

**SERVICE LIMIT: 3.5 mm (0.14 in)**

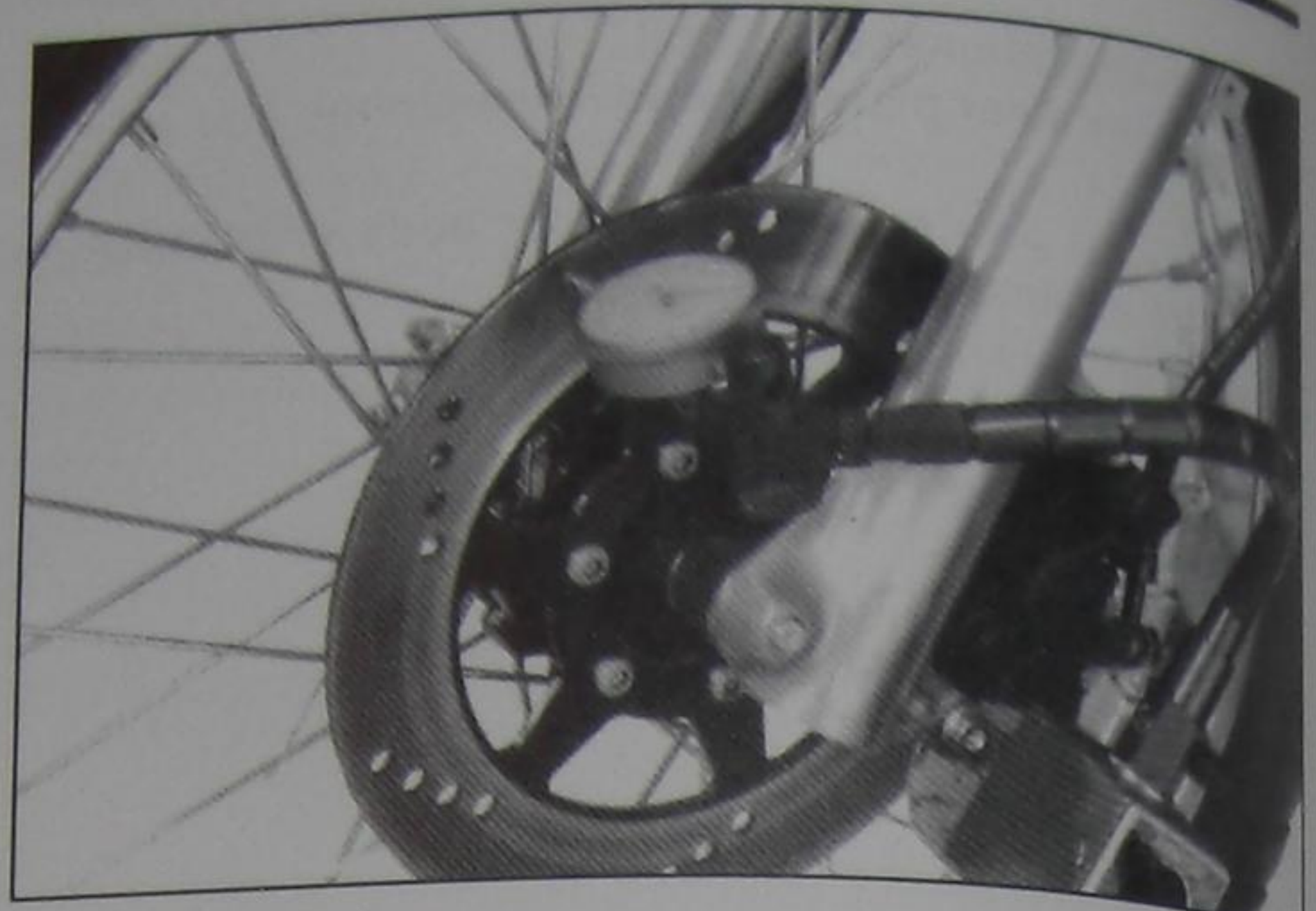
Replace the brake disc if the smallest measurement is less than the service limit.



Check the brake disc for warpage.

**SERVICE LIMIT: 0.30 mm (0.012 in)**

Check the wheel bearing for excessive play, if the warpage exceeds the service limit.
Replace the brake disc if the wheel bearings are normal.



## Master Cylinder

**CAUTION**

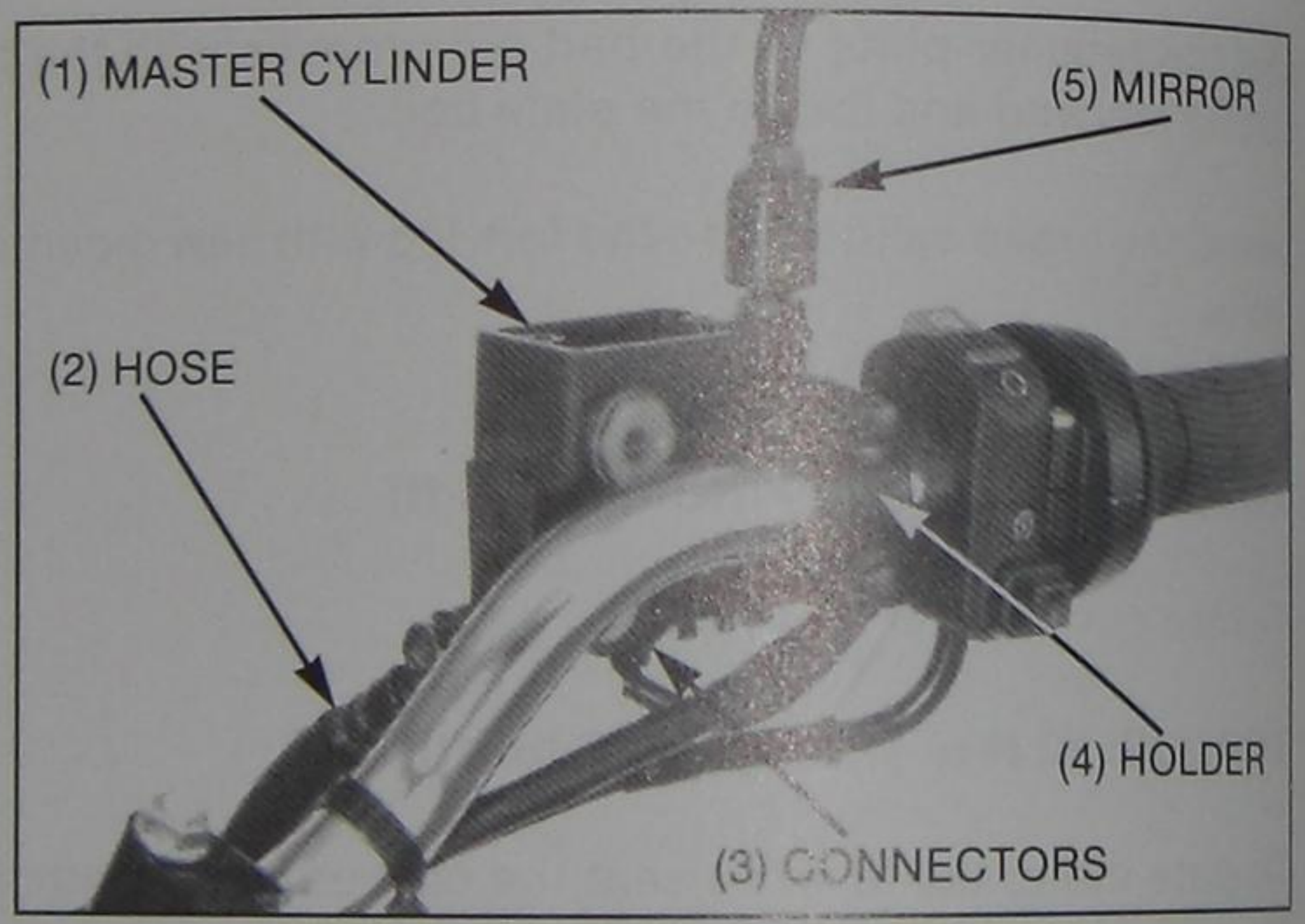
- **Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.**
- **When removing the oil bolt, cover the end of the hose to prevent contamination.**

### DISASSEMBLY

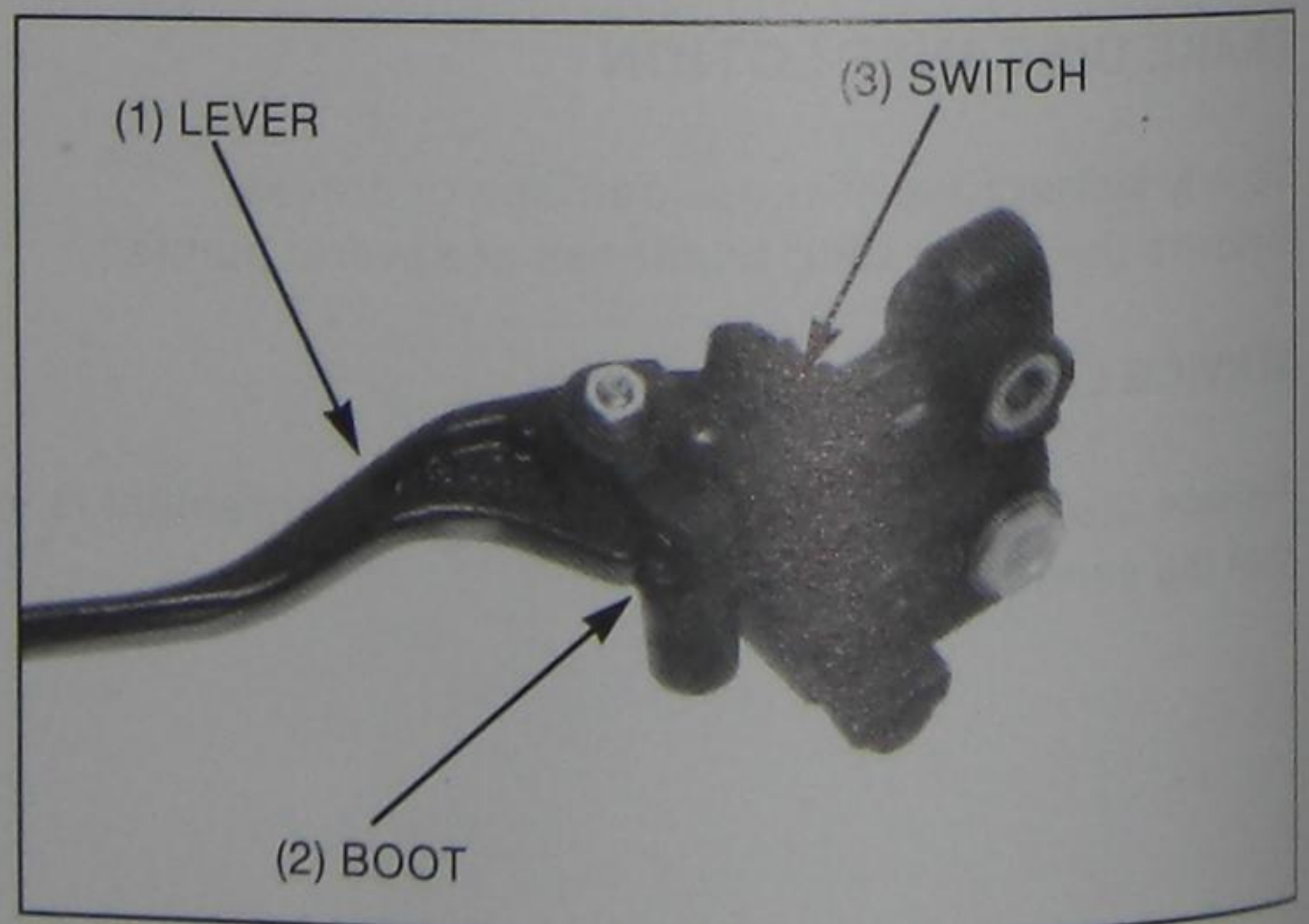
Drain the brake fluid from the front brake hydraulic system (page 14-3).

Disconnect the front brake light switch connectors.
Remove the rearview mirror.
Disconnect the brake hose from the master cylinder by removing the oil bolt and sealing washers.

Remove the master cylinder holder bolts, holder and the master cylinder.


(1) MASTER CYLINDER
(5) MIRROR
(2) HOSE
(4) HOLDER
(3) CONNECTORS

Remove the following:
- Screw and brake light switch
- Pivot bolt, nut and brake lever
- Piston boot

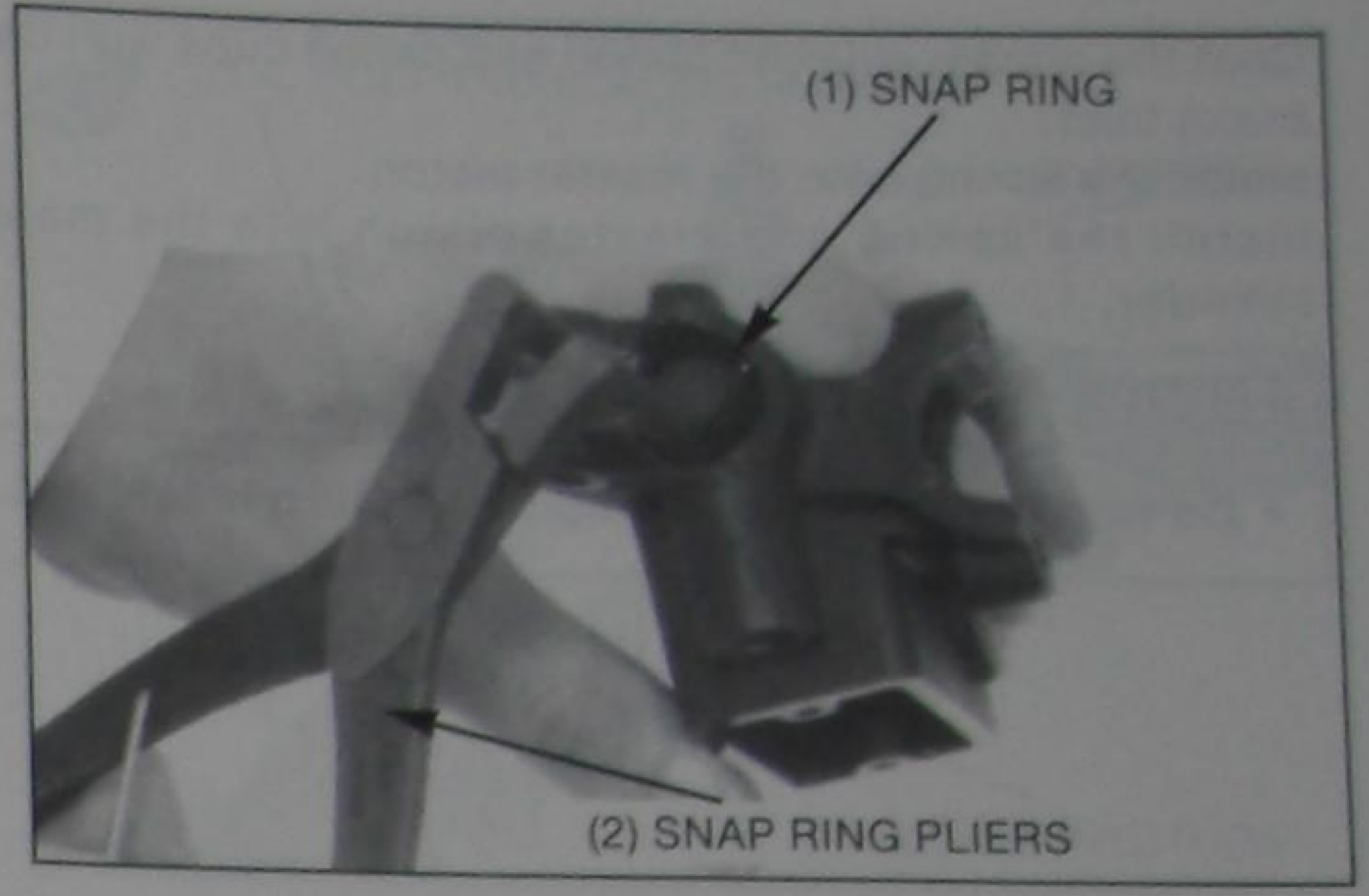

(1) LEVER
(3) SWITCH
(2) BOOT

- Snap ring

**TOOL:**
**Snap ring pliers** 07914-SA50001

- Master piston
- Spring

Clean the master cylinder, reservoir and master piston in clean brake fluid.


(1) SNAP RING
(2) SNAP RING PLIERS

### INSPECTION

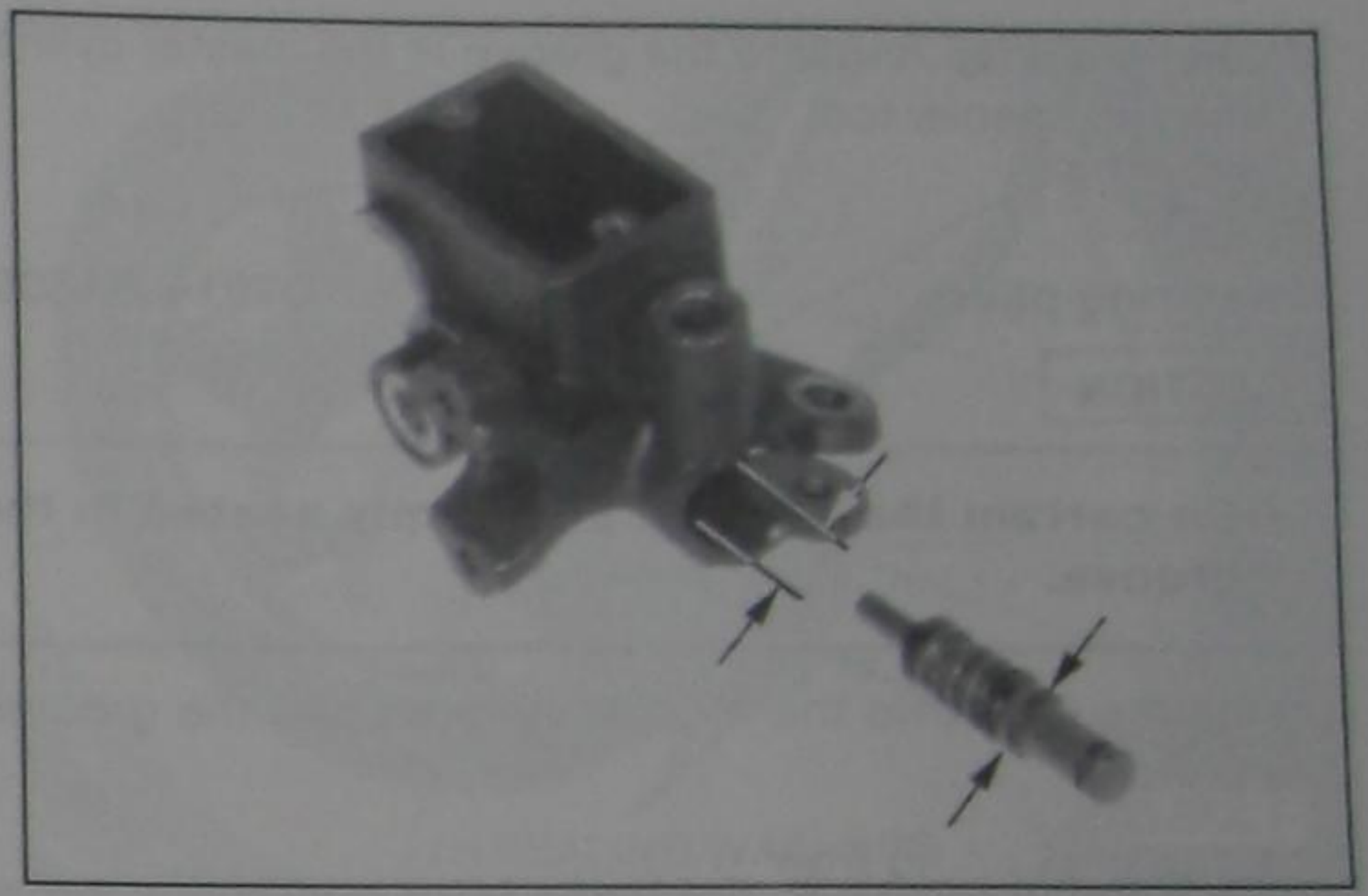
Check the piston cups for wear, deterioration or damage.
Check the spring for damage.
Check the master cylinder and piston for scoring, scratches or damage.

Measure the master cylinder I.D.

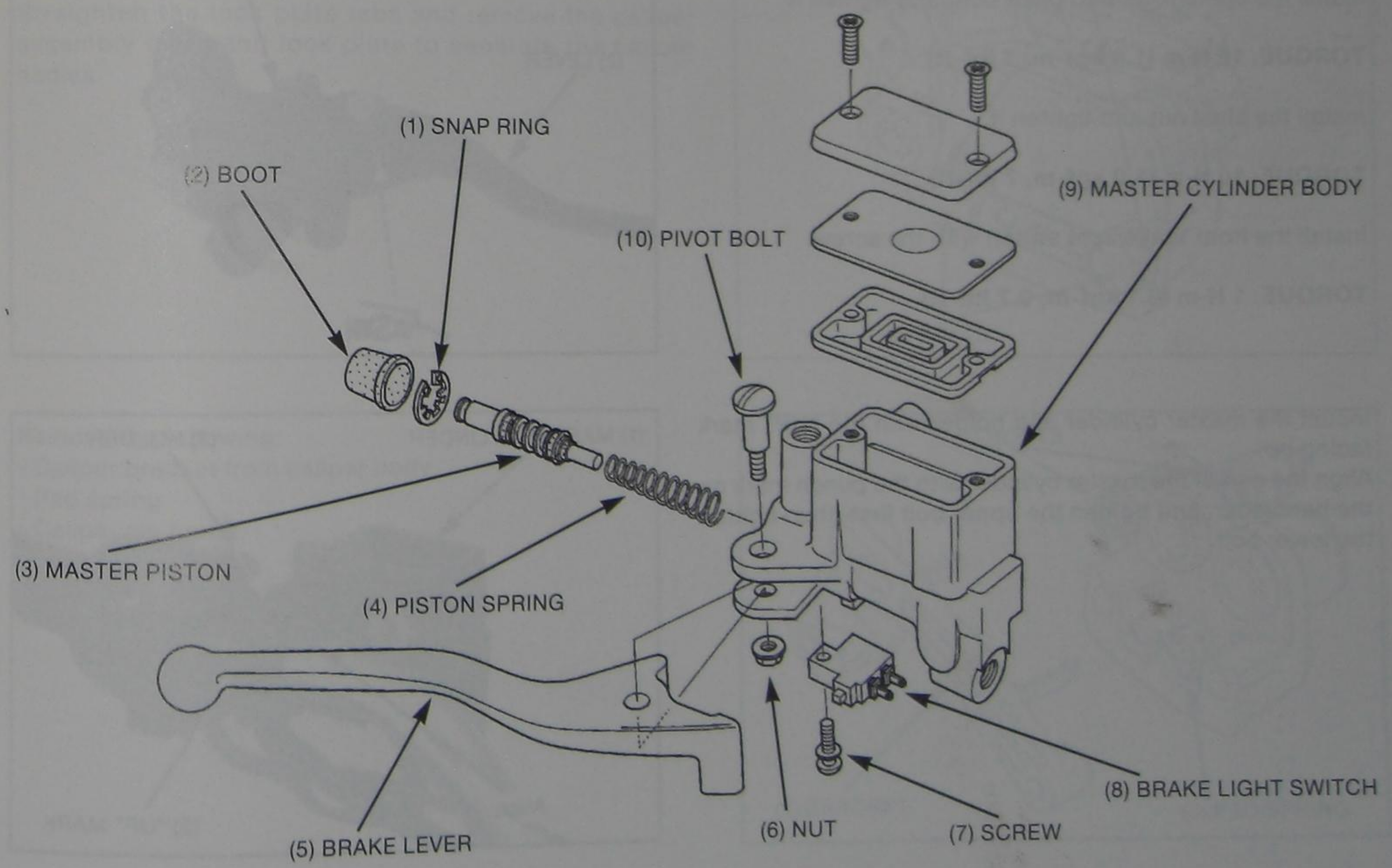
**SERVICE LIMIT: 12.75 mm (0.502 in)**

Measure the master piston O.D.

**SERVICE LIMIT: 12.65 mm (0.498 in)**



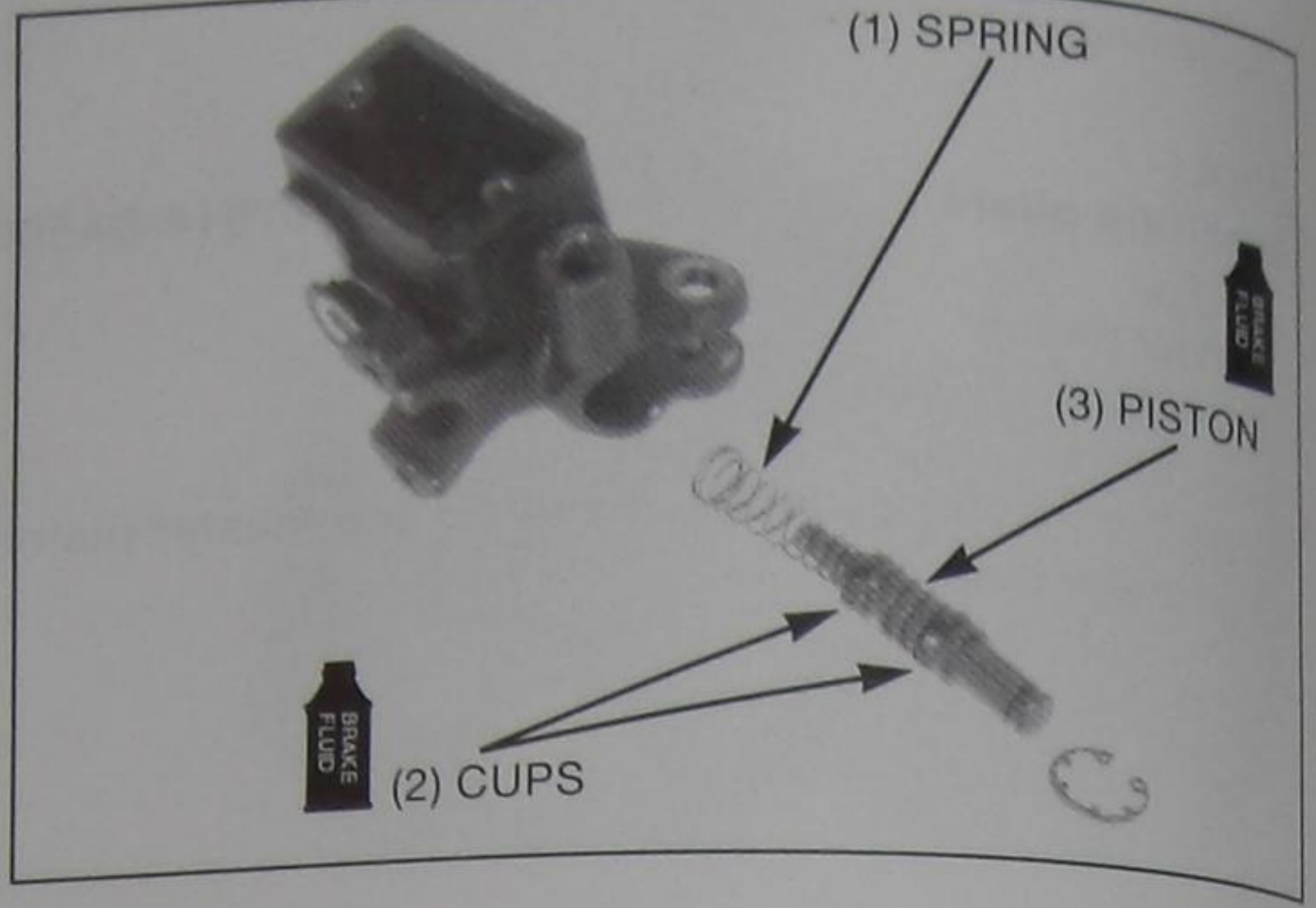
### ASSEMBLY


(1) SNAP RING
(2) BOOT
(10) PIVOT BOLT
(9) MASTER CYLINDER BODY
(3) MASTER PISTON
(4) PISTON SPRING
(8) BRAKE LIGHT SWITCH
(5) BRAKE LEVER
(6) NUT
(7) SCREW

Coat the master cylinder piston and piston cups with clean brake fluid.
Install the spring onto the master piston.
Install the spring and master piston into the master cylinder.

**CAUTION**

- **Do not allow the piston cup lips to turn inside out.**

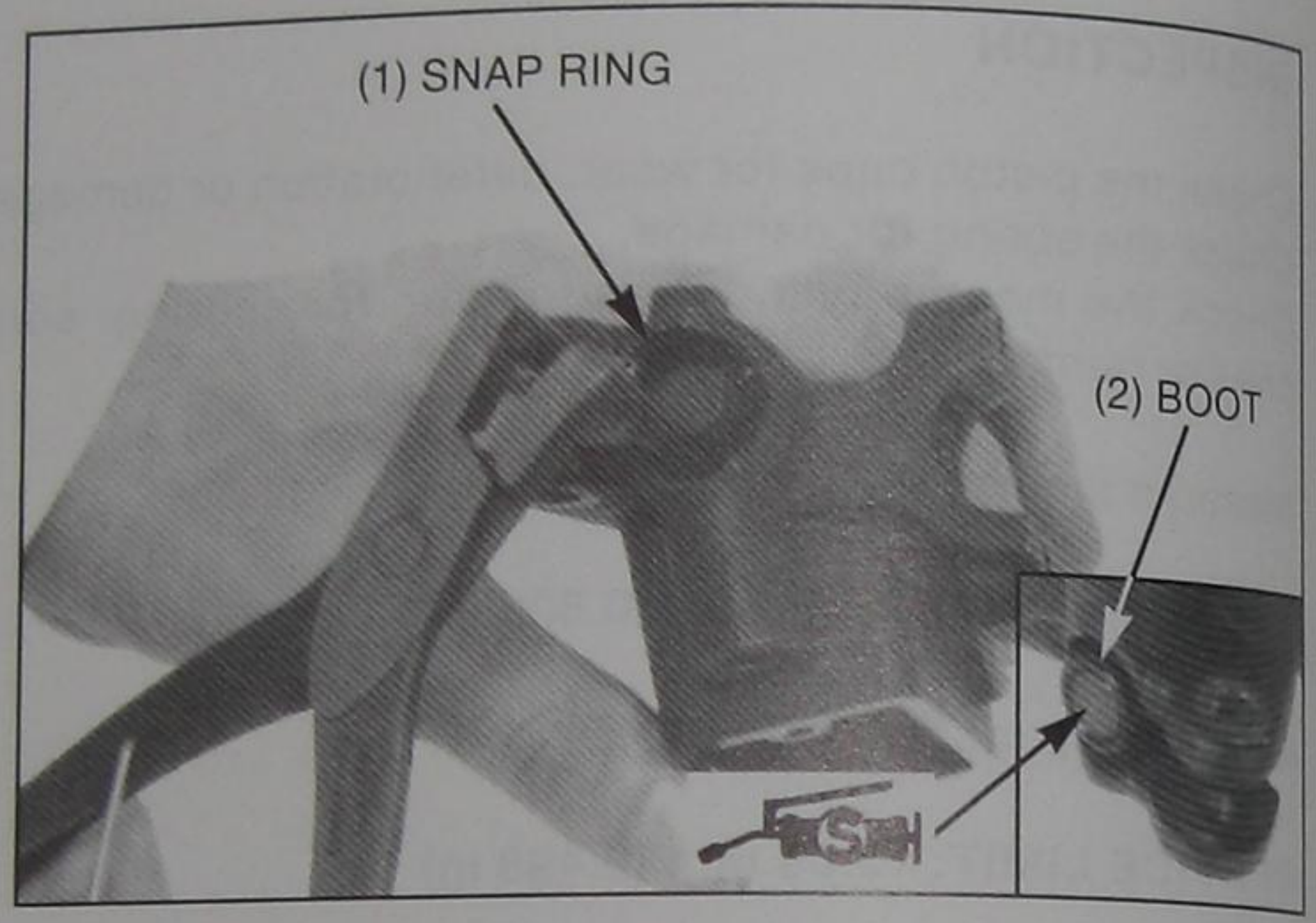

(1) SPRING
(3) PISTON
(2) CUPS
BRAKE FLUID

Install the snap ring into the groove in the master cylinder, using the special tool.

| | |
|---|---|
| **TOOL:** | |
| **Snap ring pliers** | **07914-SA50001** |

**CAUTION**

- **Be certain the snap ring is firmly seated in the groove.**


(1) SNAP RING
(2) BOOT
S

Install the boot into the master cylinder and the groove in the piston.

Apply silicone grease to the brake lever contacting surface of the piston.

Apply silicone grease to the brake lever pivot.
Install the brake lever and pivot bolt, and tighten it.

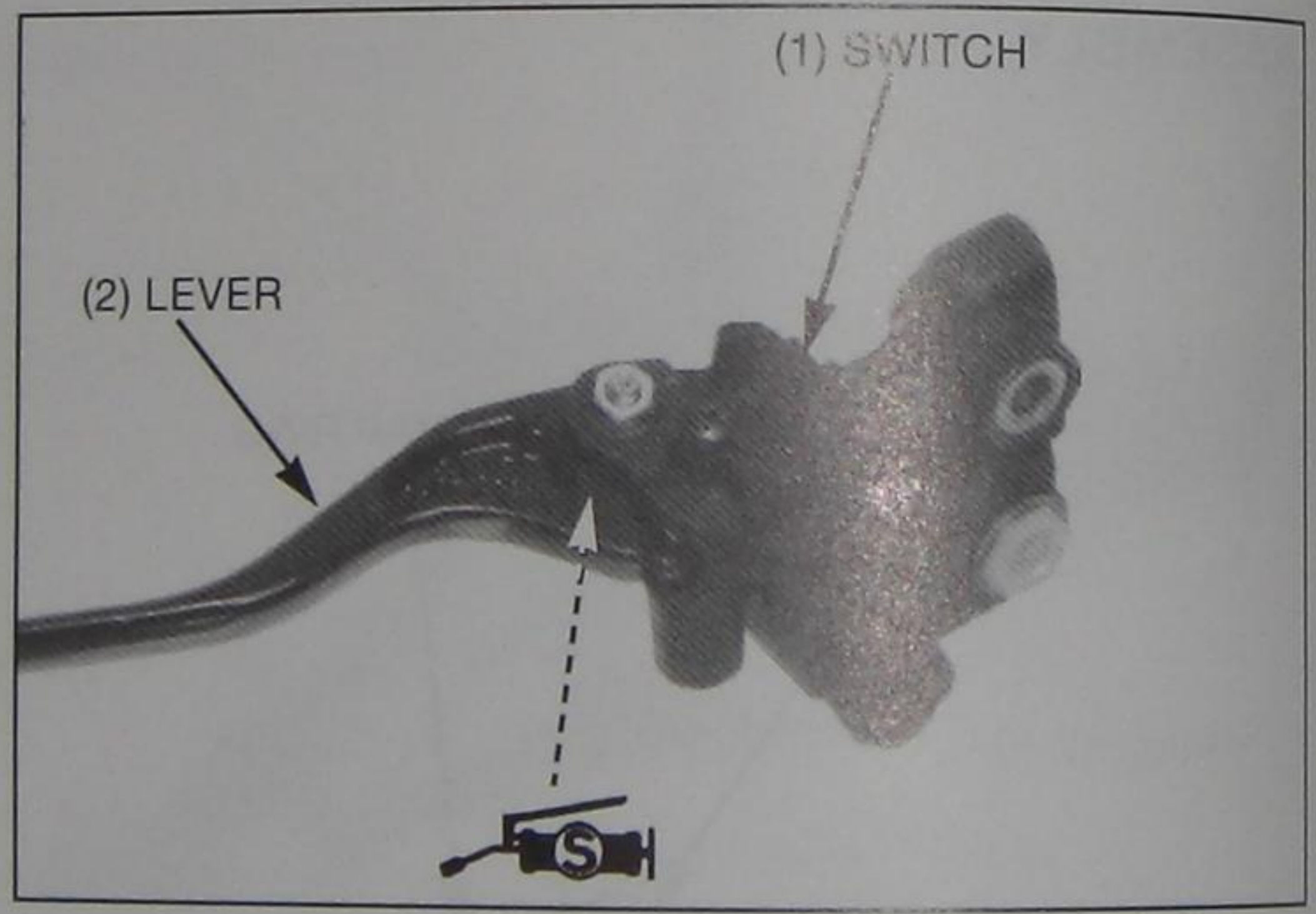
**TORQUE: 10 N·m (1.0 kgf-m, 7 lbf-ft)**

Install the pivot nut and tighten it.

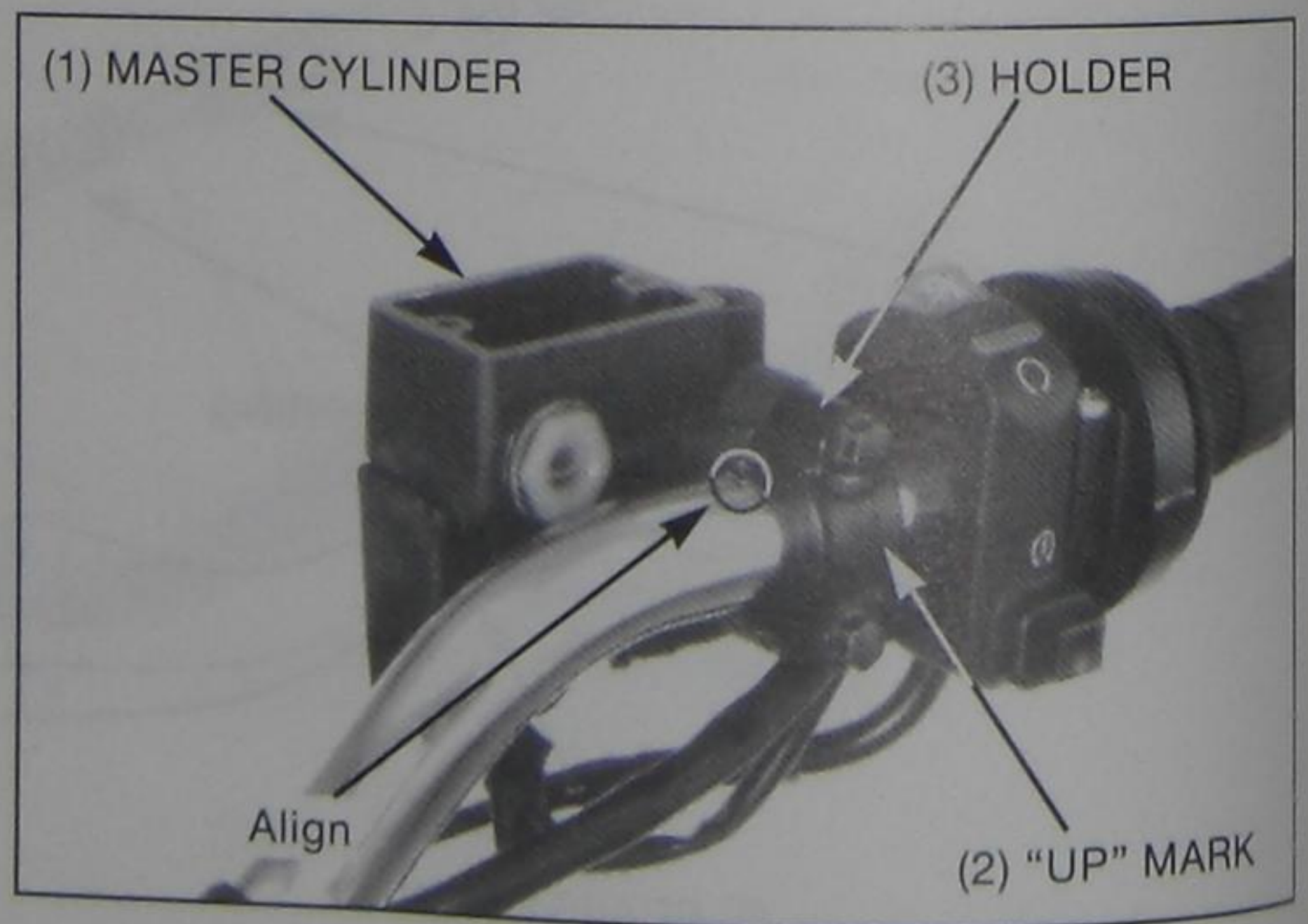
**TORQUE: 10 N·m (1.0 kgf-m, 7 lbf-ft)**

Install the front brake light switch with the screw.

**TORQUE: 1 N·m (0.1 kgf-m, 0.7 lbf-ft)**


(1) SWITCH
(2) LEVER
S

Install the master cylinder and holder with the "UP" mark facing up.
Align the end of the master cylinder with the punch mark on the handlebar, and tighten the upper bolt first, then tighten the lower bolt.


(1) MASTER CYLINDER
(3) HOLDER
Align
(2) "UP" MARK

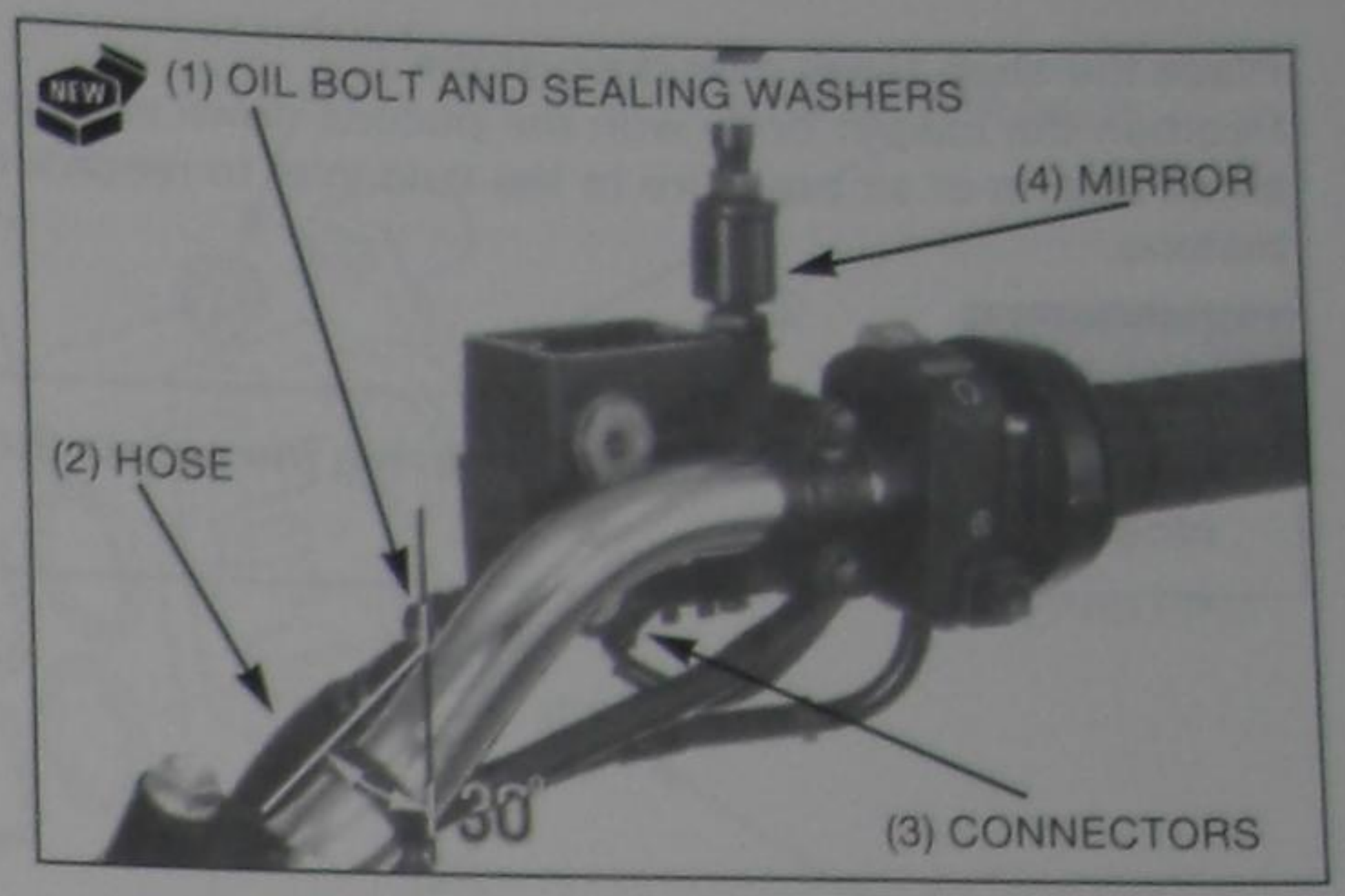
---

Connect the brake hose to the master cylinder with the oil bolt and new sealing washers, and tighten the oil bolt at an angle of the hose as shown.

**TORQUE: 29 N·m (3.0 kgf-m, 22 lbf-ft)**

Install the rearview mirror.
Connect the brake light switch connectors.

Fill and bleed the front brake hydraulic system (page 14-3).


NEW
(1) OIL BOLT AND SEALING WASHERS
(4) MIRROR
(2) HOSE
30°
(3) CONNECTORS

## Brake Caliper

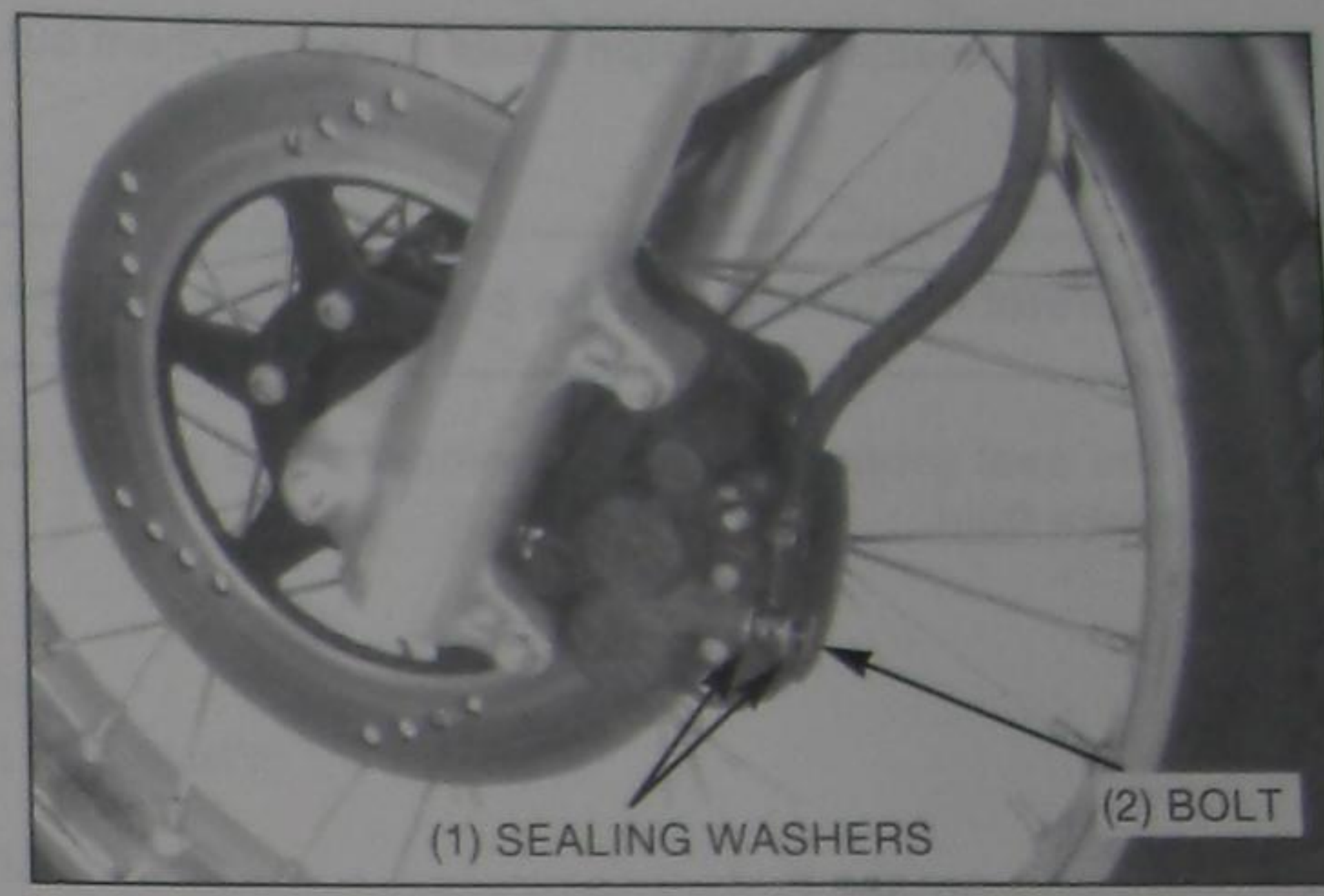
**CAUTION**

- **Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.**

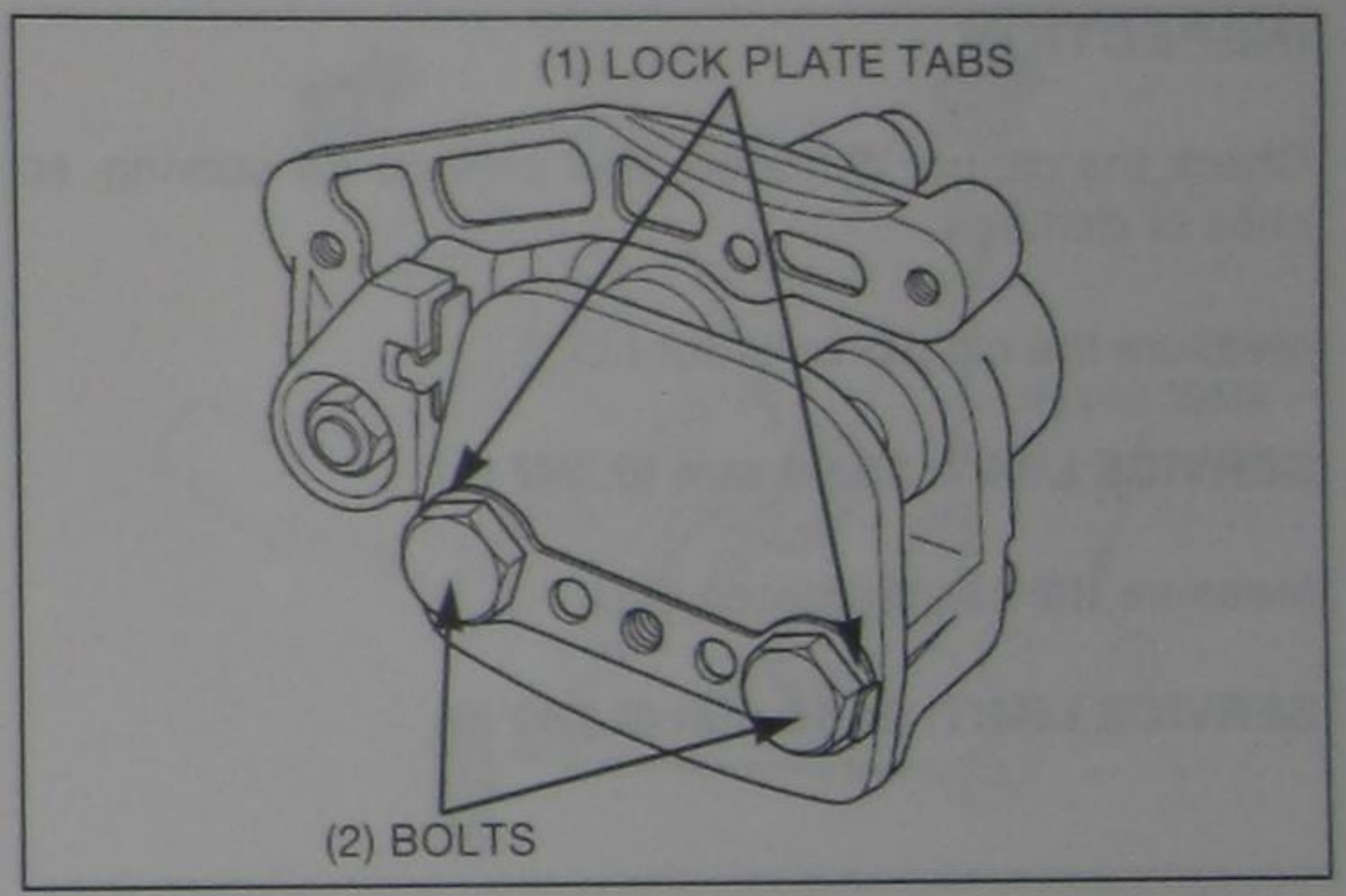
### DISASSEMBLY

Drain the brake fluid from the front brake hydraulic system (page 14-3).

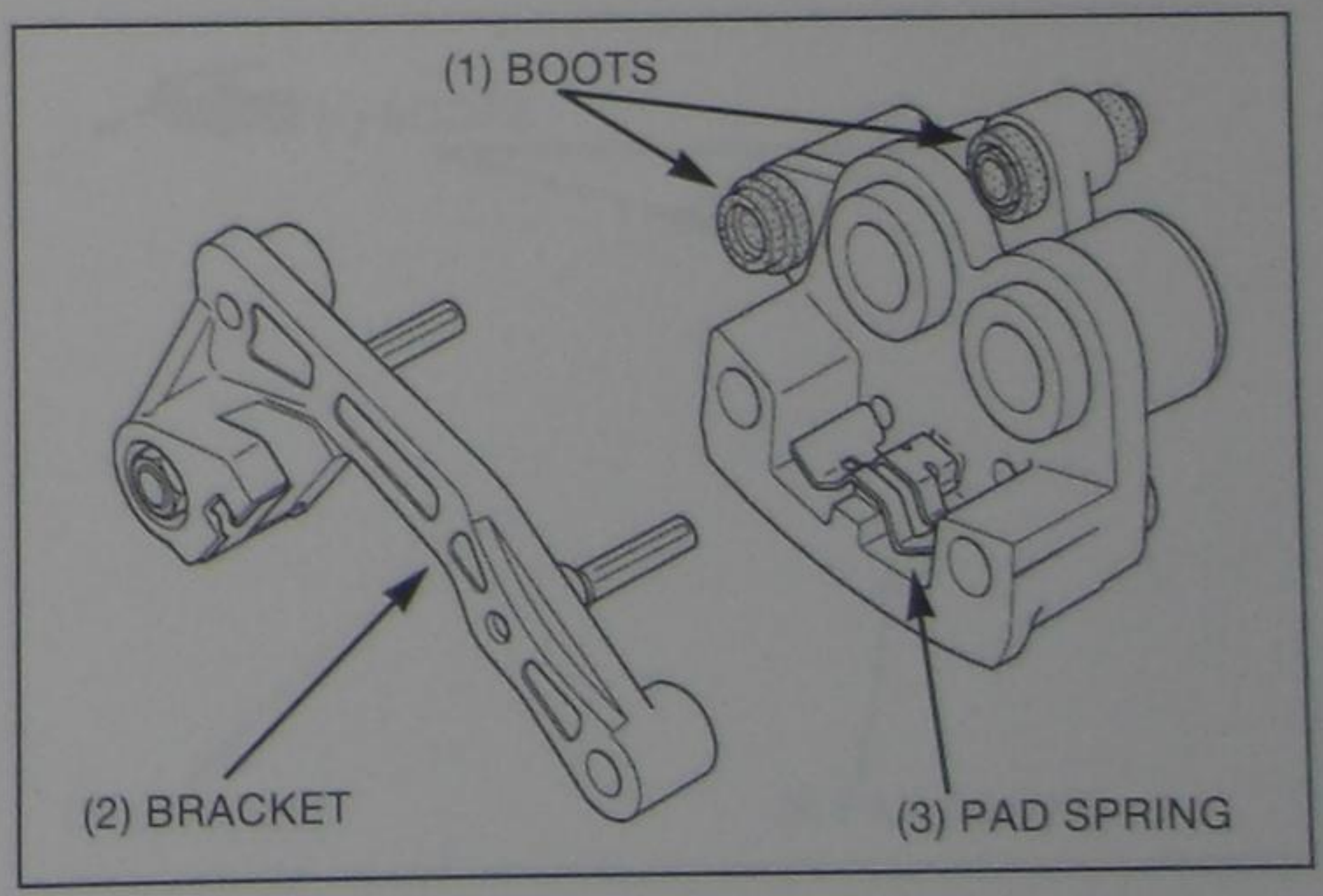
Disconnect the brake hose from the brake caliper by removing the oil bolt and sealing washers.
Remove the front brake pads (page 14-4).


(1) SEALING WASHERS
(2) BOLT

Straighten the lock plate tabs and remove the caliper assembly bolts and lock plate to separate the caliper bodies.


(1) LOCK PLATE TABS
(2) BOLTS

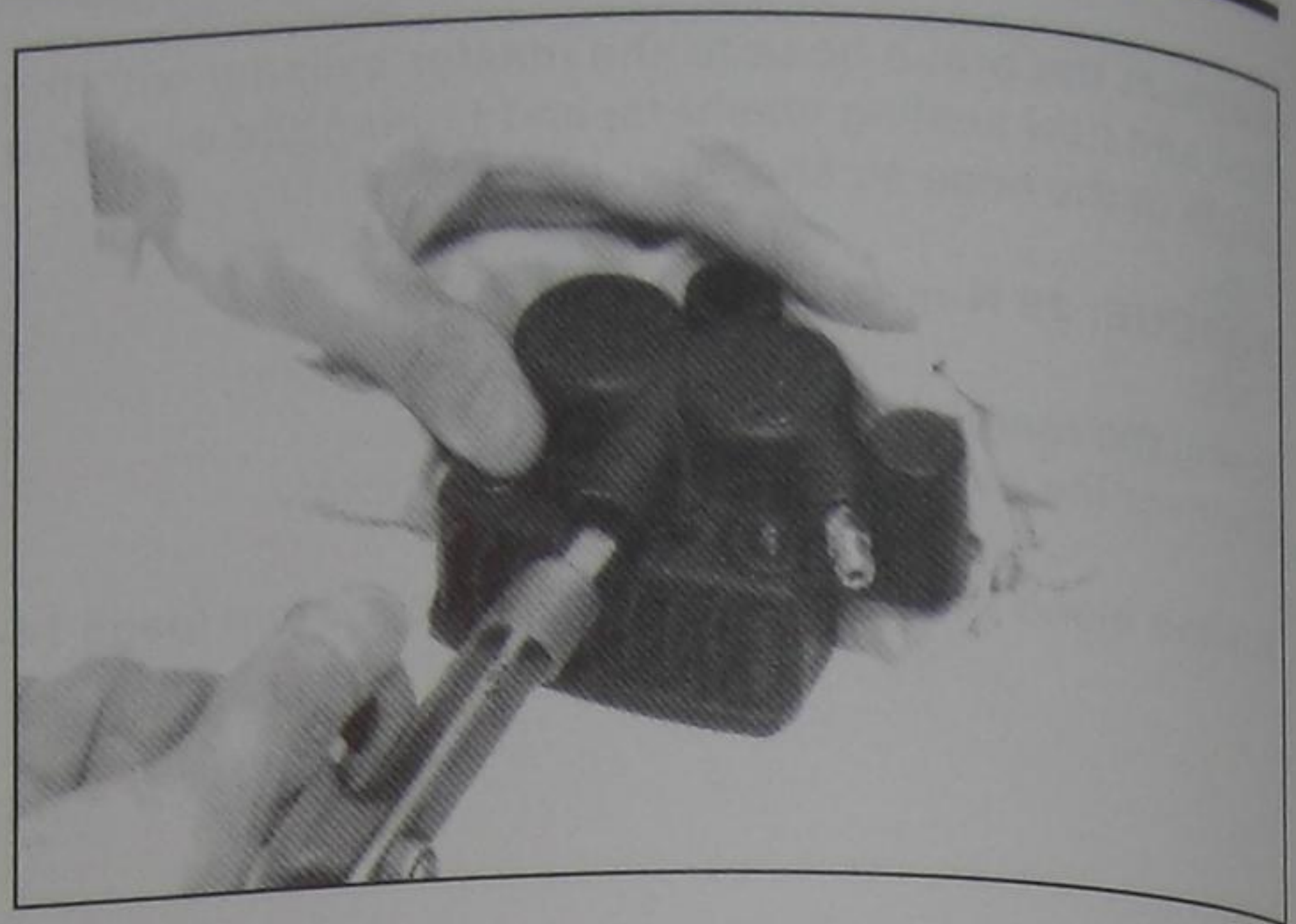
Remove the following:
- Caliper bracket from caliper body
- Pad spring
- Caliper pin boots.


(1) BOOTS
(2) BRACKET
(3) PAD SPRING

Place the shop towel over the pistons.
Position the caliper body with the pistons down and apply small squirts of air pressure to the fluid inlet to remove the pistons.

**⚠ WARNING**

- **Do not use high pressure air or bring the nozzle too close to the inlet.**



Push the dust seals and piston seals in and lift them out.

**CAUTION**

- **Be careful not to damage the piston sliding surface.**

Clean the seal grooves, caliper cylinders and piston with clean brake fluid.

### INSPECTION

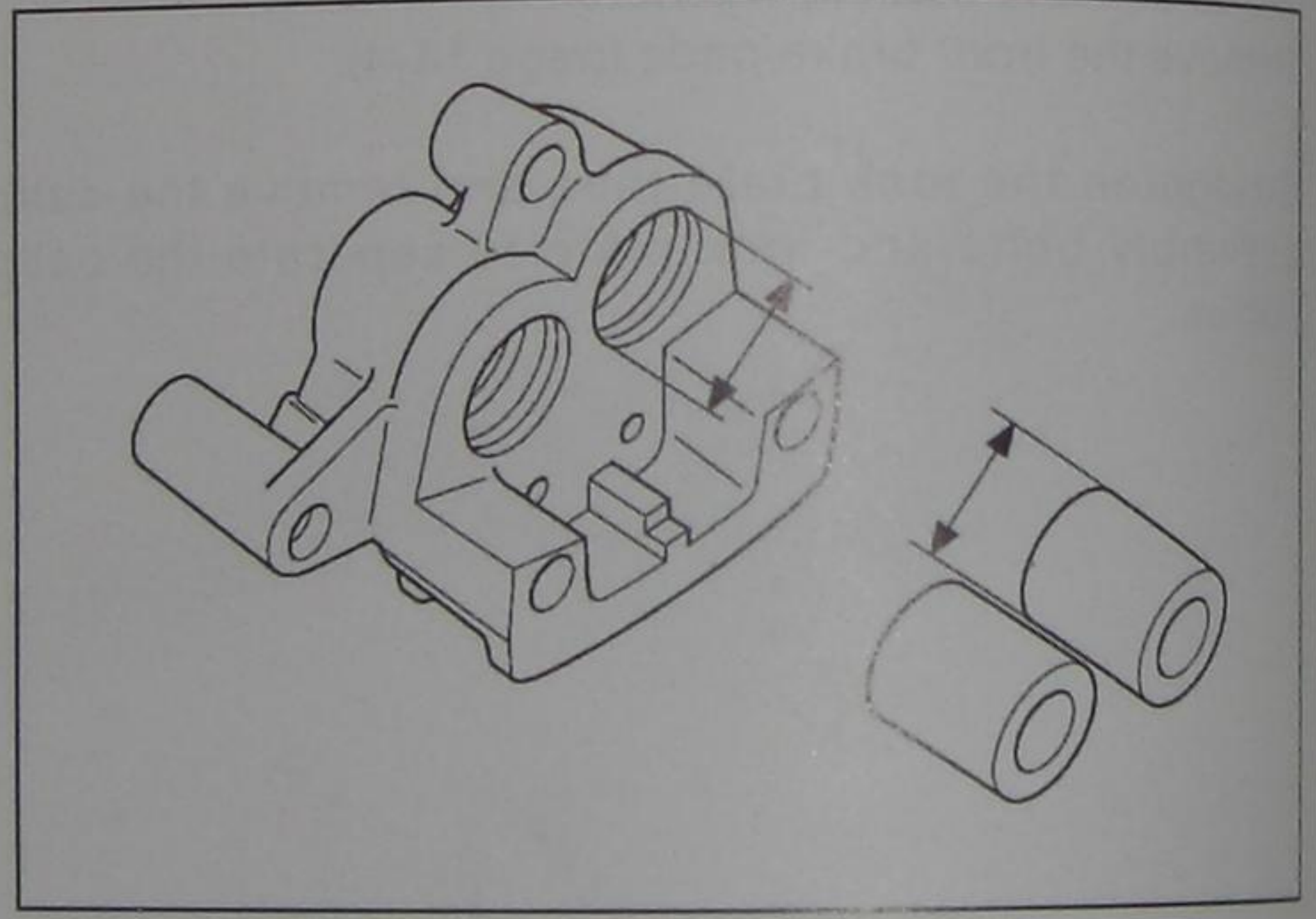
Check the caliper cylinders and pistons for scoring, scratches or damage.

Measure the caliper cylinder I.D.

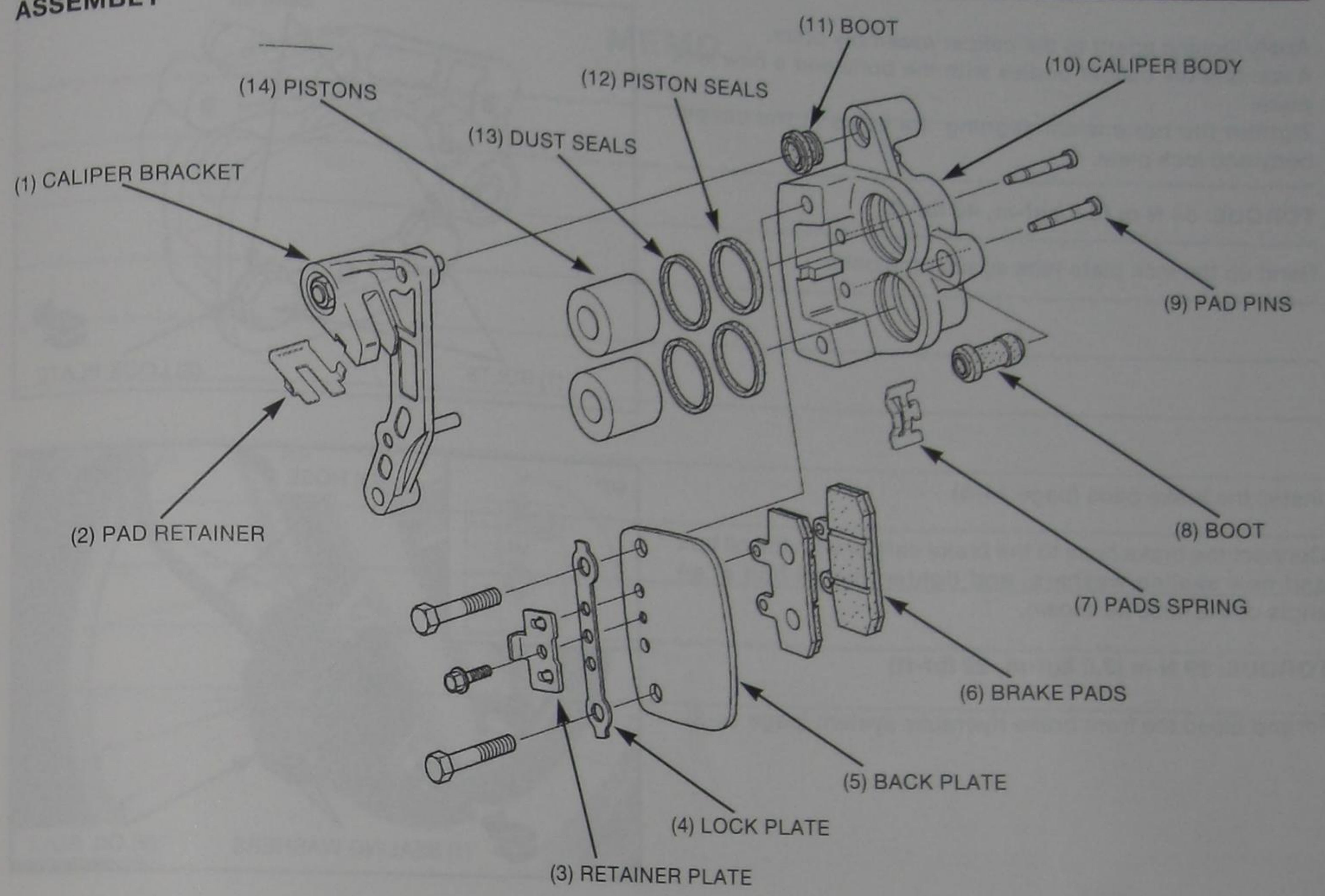
**SERVICE LIMIT: 25.06 mm (0.987 in)**

Measure the caliper piston O.D.

**SERVICE LIMIT: 24.95 mm (0.982 in)**

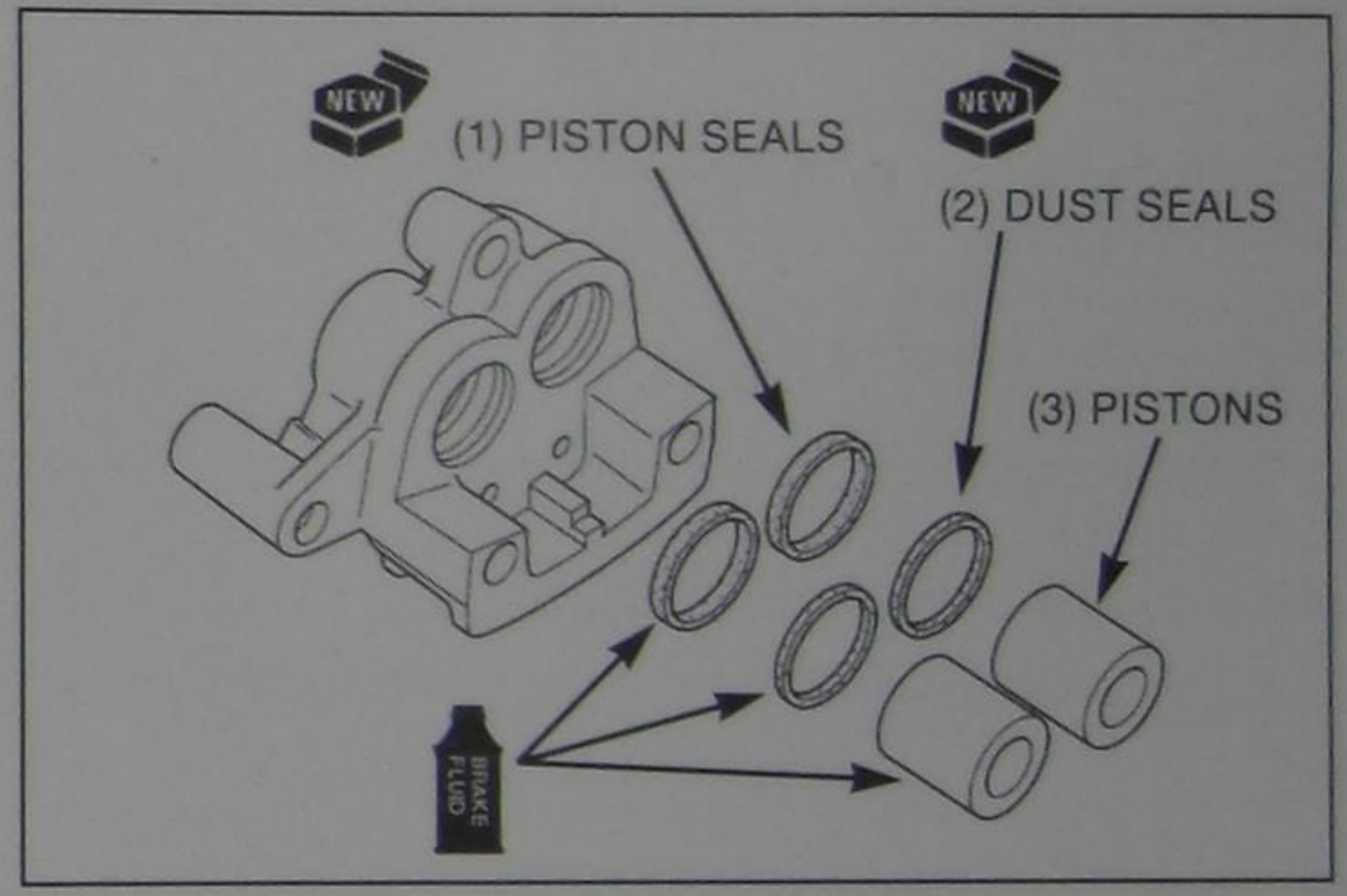


### ASSEMBLY


(11) BOOT
(10) CALIPER BODY
(12) PISTON SEALS
(14) PISTONS
(13) DUST SEALS
(1) CALIPER BRACKET
(9) PAD PINS
(2) PAD RETAINER
(8) BOOT
(7) PADS SPRING
(6) BRAKE PADS
(5) BACK PLATE
(4) LOCK PLATE
(3) RETAINER PLATE

Coat new piston and dust seals with clean brake fluid and install them in the seal grooves in the caliper.

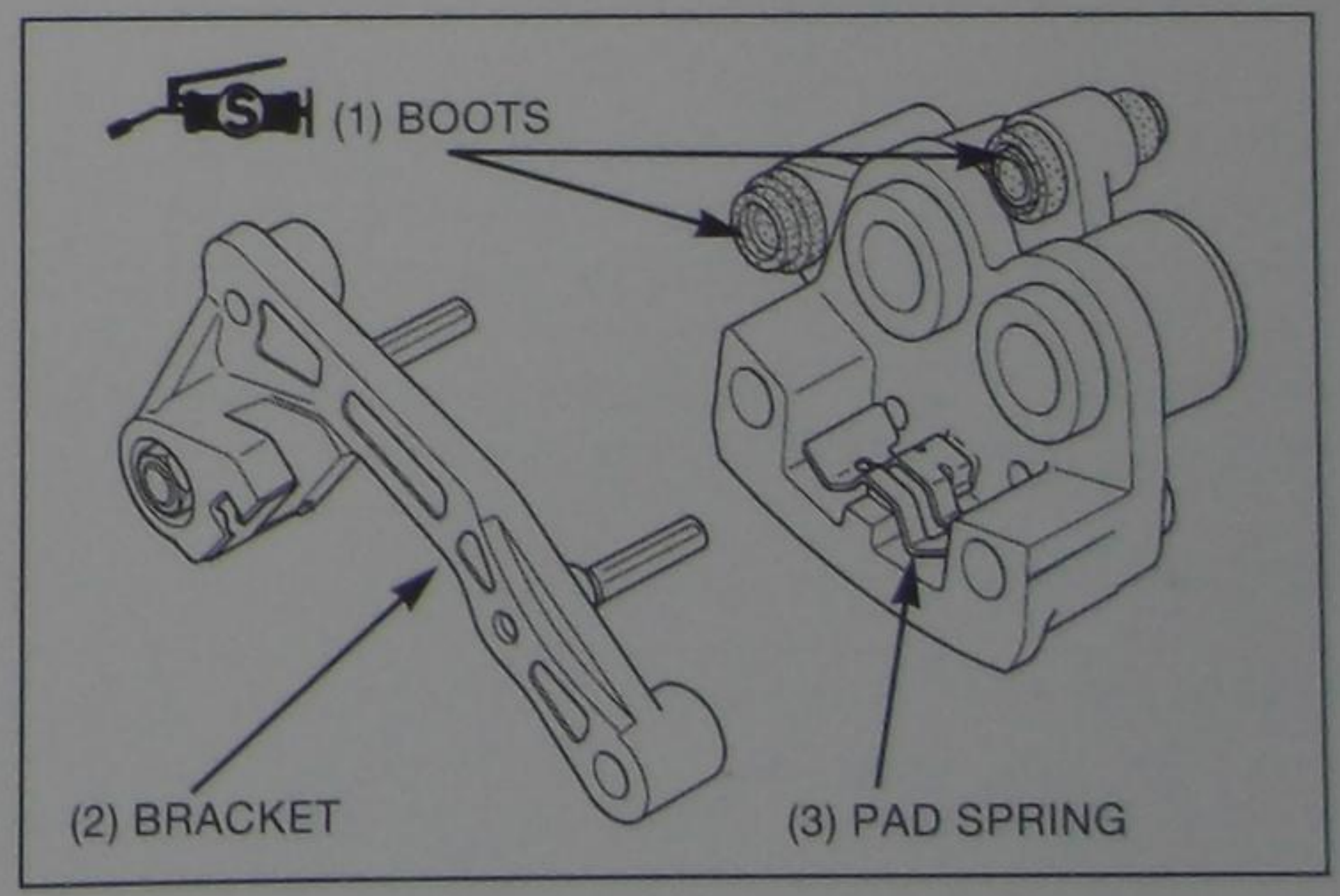
Coat the caliper pistons with clean brake fluid and install them into the caliper cylinders with the opening toward the pads.

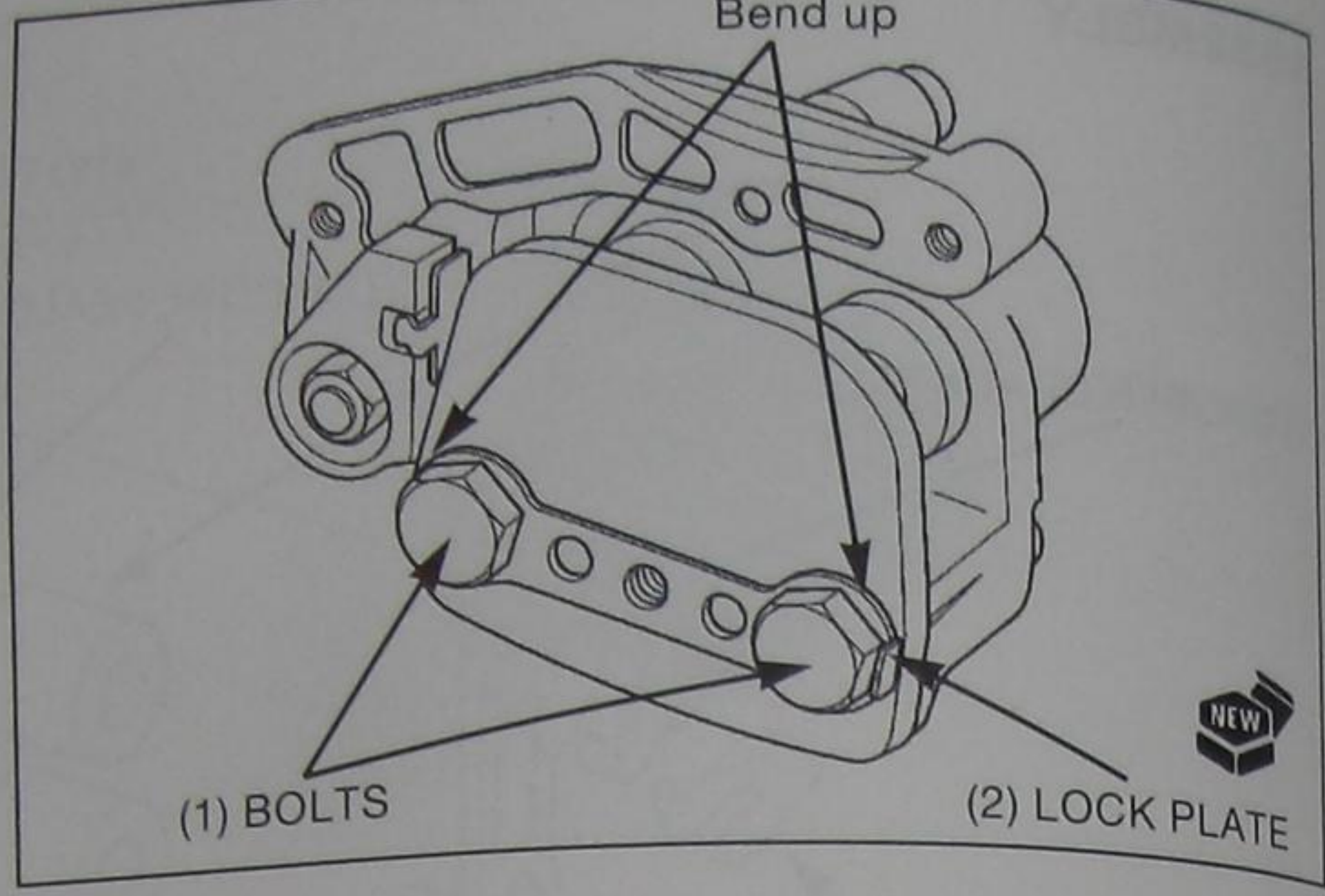

NEW
(1) PISTON SEALS
NEW
(2) DUST SEALS
(3) PISTONS
BRAKE FLUID

If the pin boots are hard or deteriorated, replace them with new ones.
Install the pin boots into the caliper body and pack silicone grease to the inside of the boots.

Install the pad spring as shown.

Install the caliper bracket over the caliper body.
Make sure that the boots are seated securely into the pin grooves.

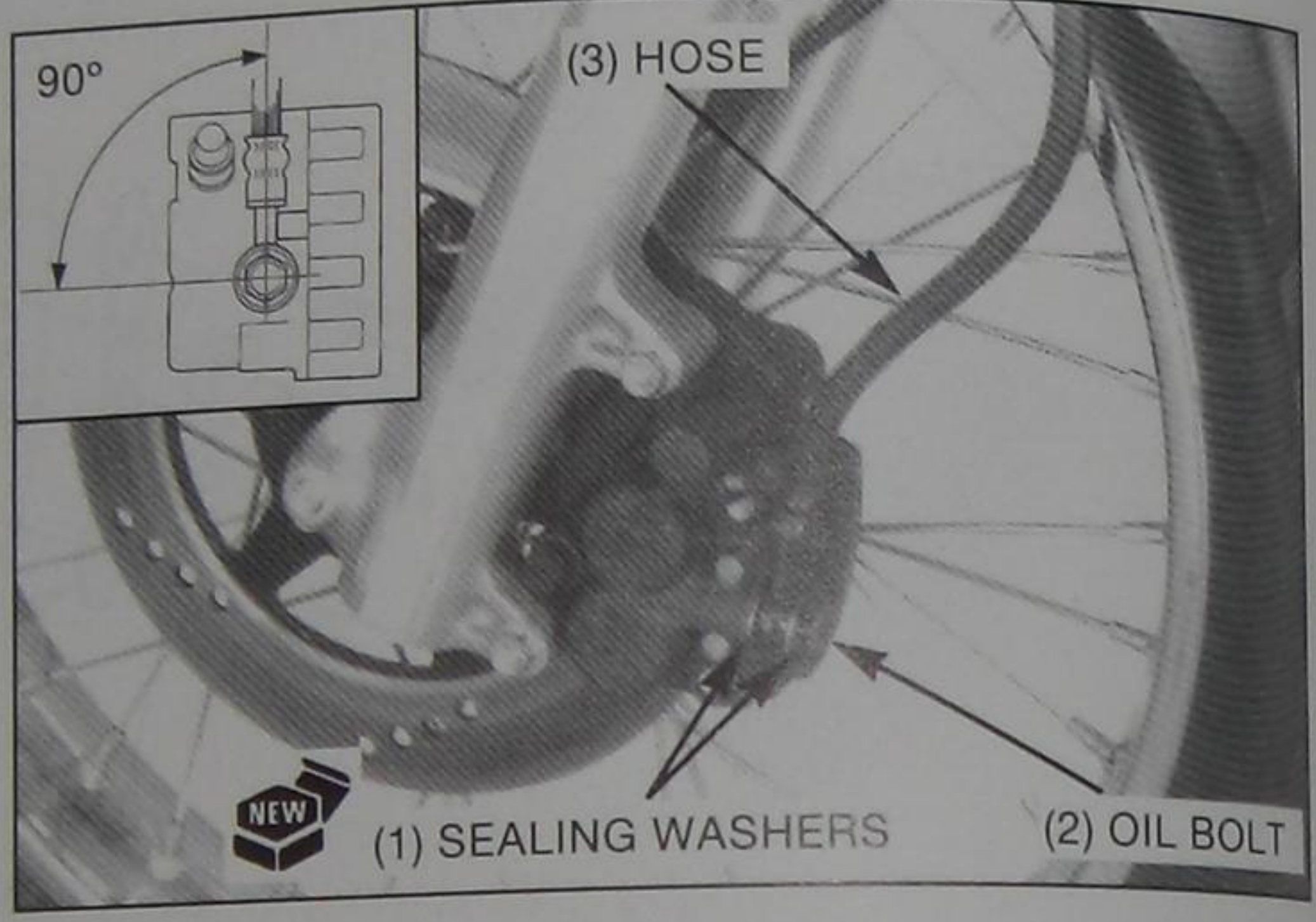

S
(1) BOOTS
(2) BRACKET
(3) PAD SPRING


Bend up
(1) BOLTS
(2) LOCK PLATE
NEW

Apply locking agent to the caliper assembly bolts.
Assemble the caliper bodies with the bolts and a new lock plate.
Tighten the bolts while aligning the holes in the caliper body and lock plate.

**TORQUE: 54 N·m (5.5 kgf-m, 40 lbf-ft)**

Bend up the lock plate tabs against the bolts.


90°
(3) HOSE
NEW
(1) SEALING WASHERS
(2) OIL BOLT

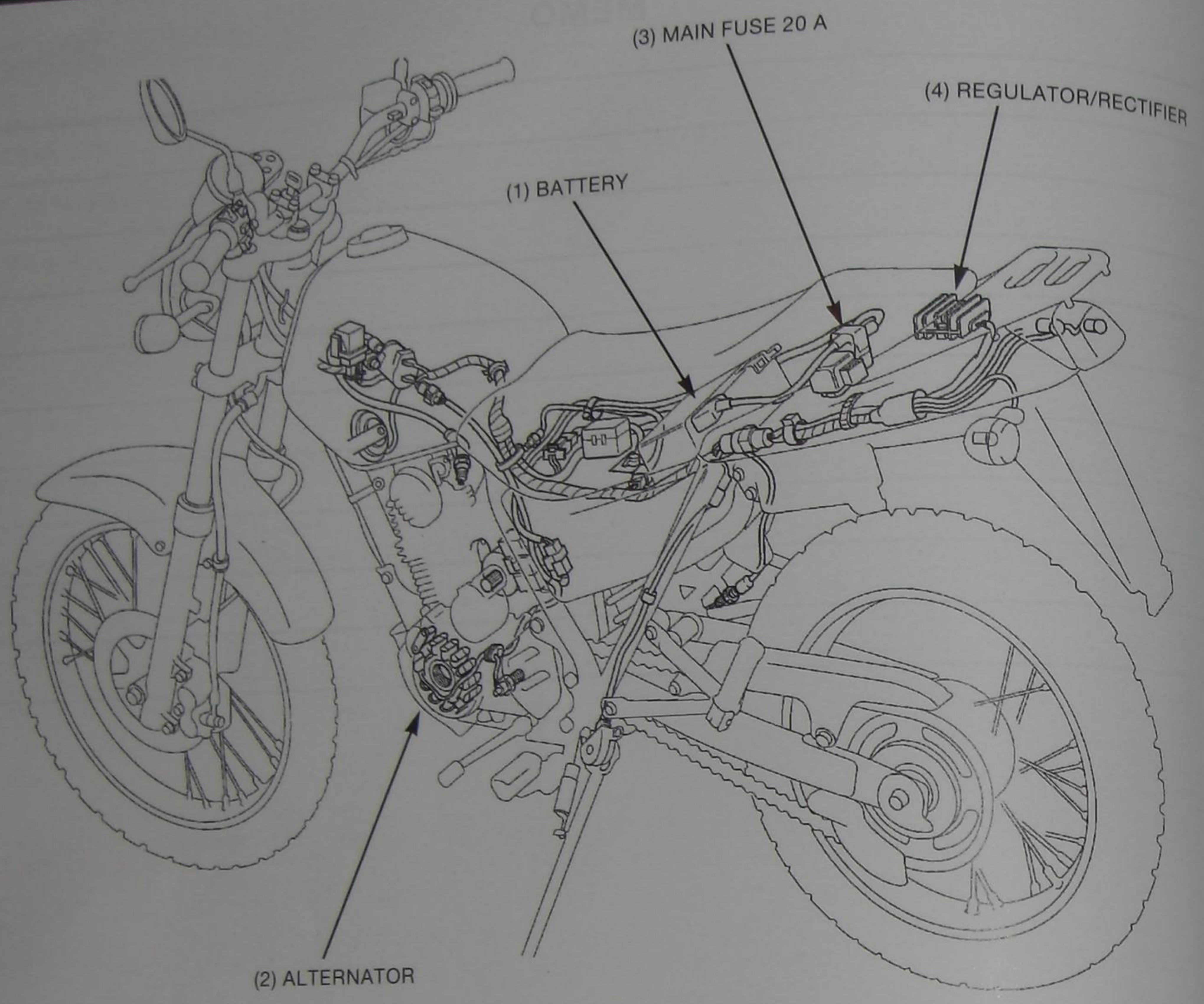
Install the brake pads (page 14-5).

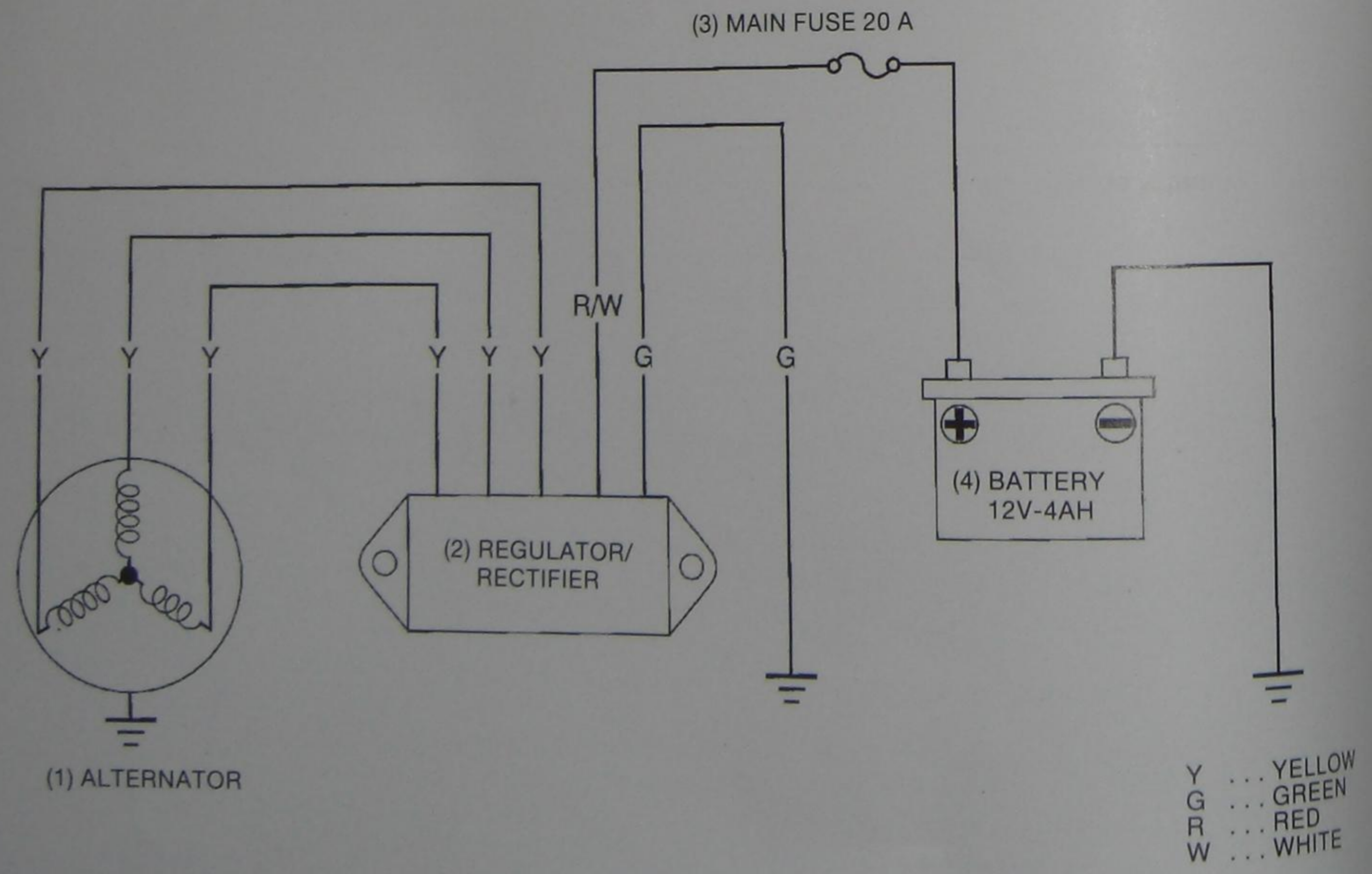
Connect the brake hose to the brake caliper with the oil bolt and new sealing washers, and tighten the oil bolt at an angle of the hose as shown.

**TORQUE: 29 N·m (3.0 kgf-m, 22 lbf-ft)**

Fill and bleed the front brake hydraulic system (page 14-3).

## MEMO





# 15. Battery/Charging System

SERVICE INFORMATION 15-1
TROUBLESHOOTING 15-3
BATTERY 15-5
CHARGING SYSTEM INSPECTION 15-6
REGULATOR/RECTIFIER 15-8
ALTERNATOR CHARGING COIL 15-8

## Service Information

### GENERAL

**⚠ WARNING**

- **The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.**
- **The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.**
  - **If electrolyte gets on your skin, flush with water.**
  - **If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.**
- **Electrolyte is poisonous.**
  - **If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician. KEEP OUT OF REACH OF CHILDREN.**

- Always turn off the ignition switch before disconnecting any electrical component.

**CAUTION**

- **Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.**

- For extended storage, remove the battery, give it a full charge, and store it in a cold, dry place.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery.

NOTE:

- The maintenance free battery must be replaced when it reaches the end of its service life.

**CAUTION**

- **The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.**

- The battery can be damaged if overcharged or undercharged, or if left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2-3 years.
- Battery voltage may recover after battery charging, but under heavy load, the battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from occurring.
- Filling a new battery electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. also, the battery life is lengthened when it is initially charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 15-3).
- For alternator service, refer to section 10.

- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
  - Use only the electrolyte that comes with the battery.
  - Use all of the electrolyte.
  - Seal the battery properly.
  - Never open the seals again.

**CAUTION**

- **For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.**

## SPECIFICATIONS

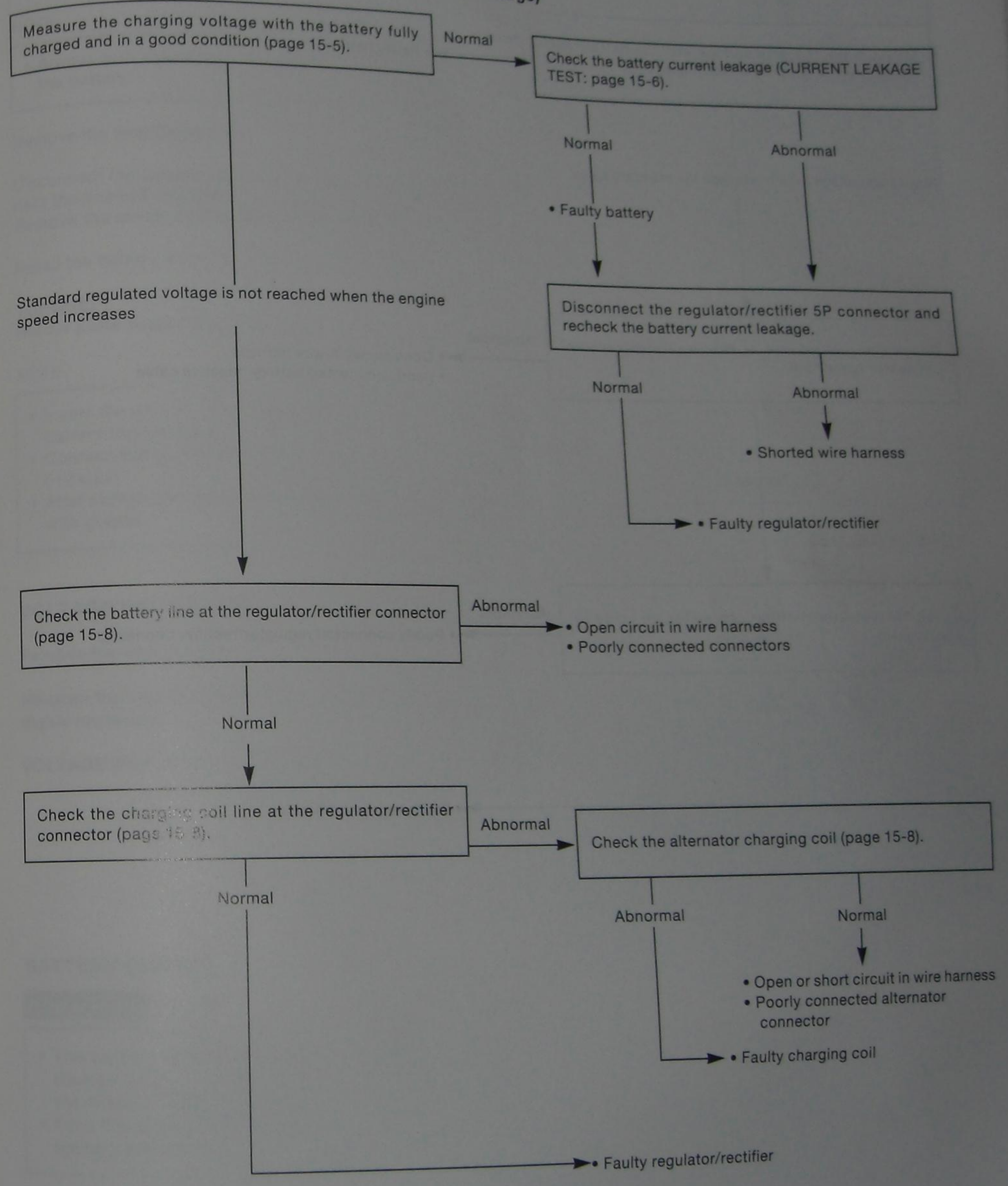
| Item | | | Specifications |
|---|---|---|---|
| Battery | Capacity | | 12 V - 4 Ah |
| | Voltage at 20°C (68°F) | Fully charged | Above 12.8 V |
| | | Needs charging | Below 12.3 V |
| | Charging rate | Normal | 0.5 A/5-10 h |
| | | Quick | 5 A/0.5 h |
| | Current leakage | | 1 mA max. |
| Regulator/rectifier regulated voltage | | | 14.0-14.8 V/5,000 $\text{min}^{-1}$ (rpm) |
| Alternator | Capacity | | 200 W/5,000 $\text{min}^{-1}$ (rpm) |
| | Charging coil at 20°C (68°F) | | 0.1 - 1.0 Ω |

## TORQUE VALUES

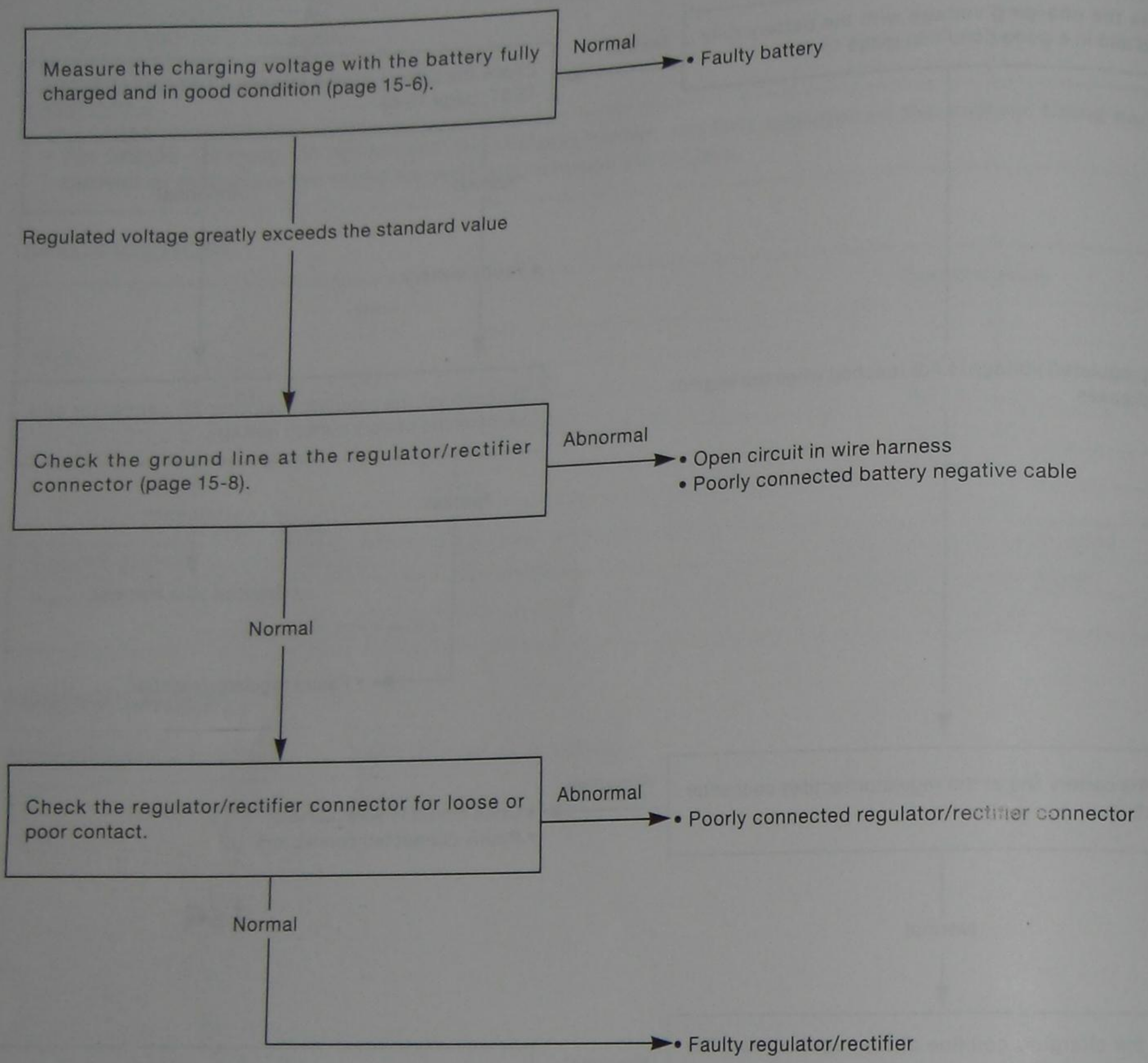
| | |
|---|---|
| Battery holder plate screw | 3 N·m (0.3 kgf-m, 2.2 lbf-ft) |

## Troubleshooting

**Battery undercharging (voltage not raised to regulated voltage)**


Measure the charging voltage with the battery fully charged and in a good condition (page 15-5).
Normal
Check the battery current leakage (CURRENT LEAKAGE TEST: page 15-6).
Normal
Abnormal
• Faulty battery
Disconnect the regulator/rectifier 5P connector and recheck the battery current leakage.
Normal
Abnormal
• Shorted wire harness
• Faulty regulator/rectifier
Standard regulated voltage is not reached when the engine speed increases
Check the battery line at the regulator/rectifier connector (page 15-8).
Abnormal
• Open circuit in wire harness
• Poorly connected connectors
Normal
Check the charging coil line at the regulator/rectifier connector (page 15-8).
Abnormal
Check the alternator charging coil (page 15-8).
Abnormal
Normal
• Open or short circuit in wire harness
• Poorly connected alternator connector
• Faulty charging coil
Normal
• Faulty regulator/rectifier

**Battery overcharging (regulated voltage too high)**

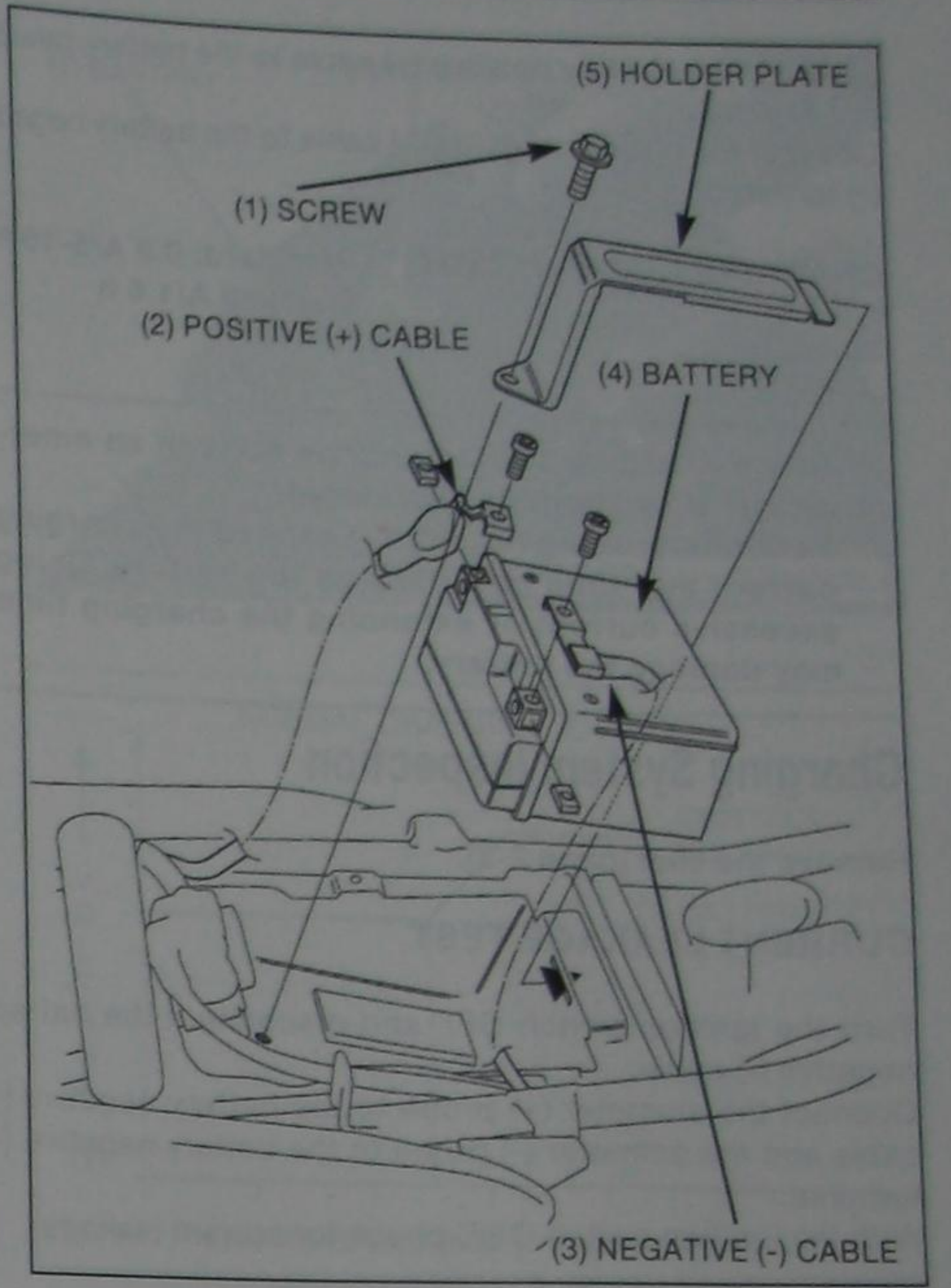

Measure the charging voltage with the battery fully charged and in good condition (page 15-6).
Normal
• Faulty battery
Regulated voltage greatly exceeds the standard value
Check the ground line at the regulator/rectifier connector (page 15-8).
Abnormal
• Open circuit in wire harness
• Poorly connected battery negative cable
Normal
Check the regulator/rectifier connector for loose or poor contact.
Abnormal
• Poorly connected regulator/rectifier connector
Normal
• Faulty regulator/rectifier

## Battery

### REMOVAL/INSTALLATION

NOTE:

- Always turn the ignition switch OFF before removing the battery.


(1) SCREW
(5) HOLDER PLATE
(2) POSITIVE (+) CABLE
(4) BATTERY
(3) NEGATIVE (-) CABLE

Remove the seat (page 2-2).

Disconnect the battery negative (-) cable first, then disconnect the positive (+) cable.
Remove the screw, holder plate and the battery.

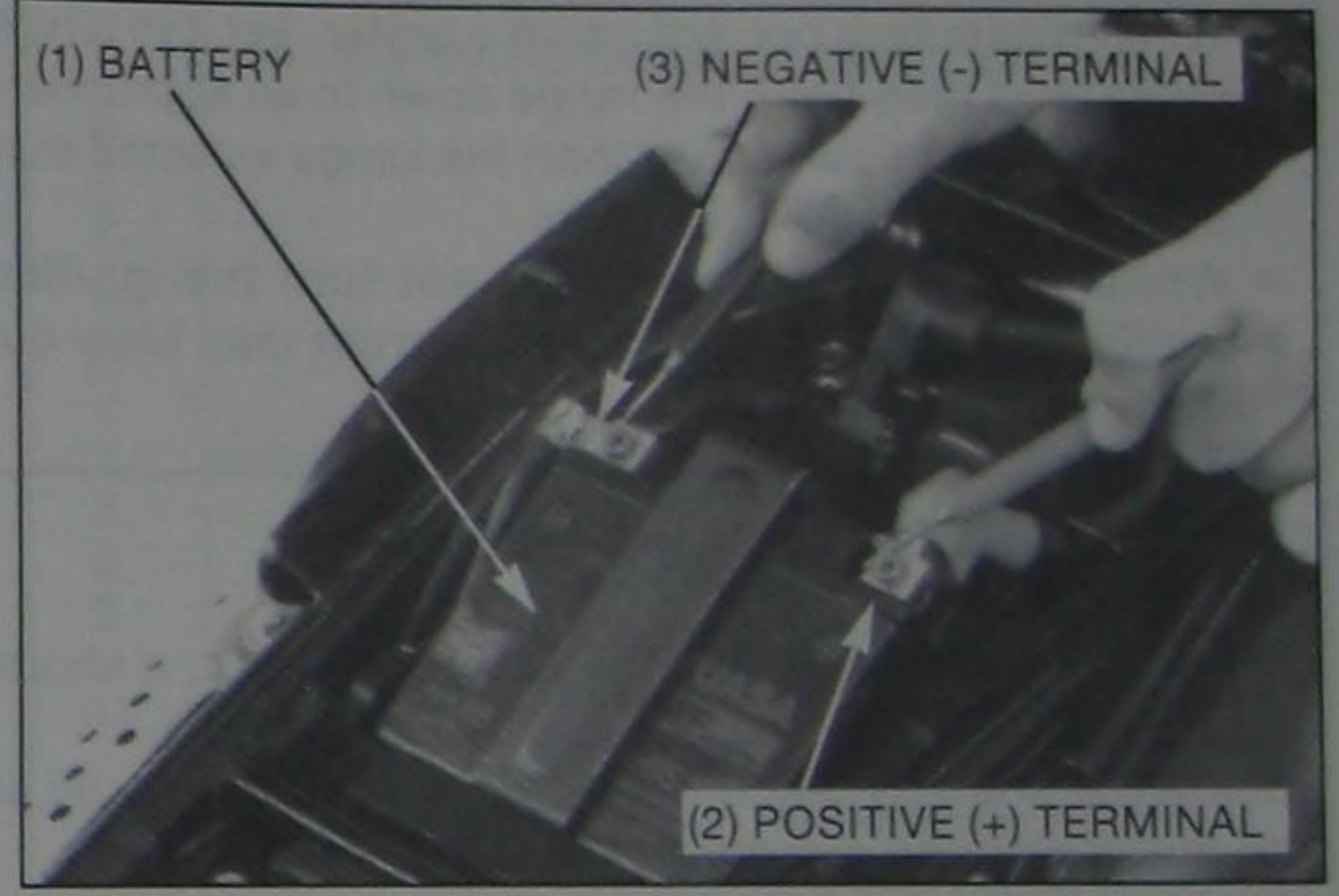
Install the battery in the reverse order of removal.

**TORQUE:**
**Holder plate screw: 3 N·m (0.3 kgf-m, 2.2 lbf-ft)**

NOTE:

- Insert the end of the holder plate into the slit in the battery tray properly.
- Connect the positive (+) cable first, then the negative (-) cable.
- After connecting the battery cables, coat the terminals with grease.

### VOLTAGE INSPECTION


(1) BATTERY
(3) NEGATIVE (-) TERMINAL
(2) POSITIVE (+) TERMINAL

Remove the seat (page 2-2).

Measure the battery voltage using a commercially available digital multimeter.

**VOLTAGE (20°C/68°F): Fully charged: Above 12.8 V**
**Under charged: Below 12.3 V**

### BATTERY CHARGING

**⚠ WARNING**

- **The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.**
- **Turn the power ON/OFF at the charger, not at the battery terminals.**

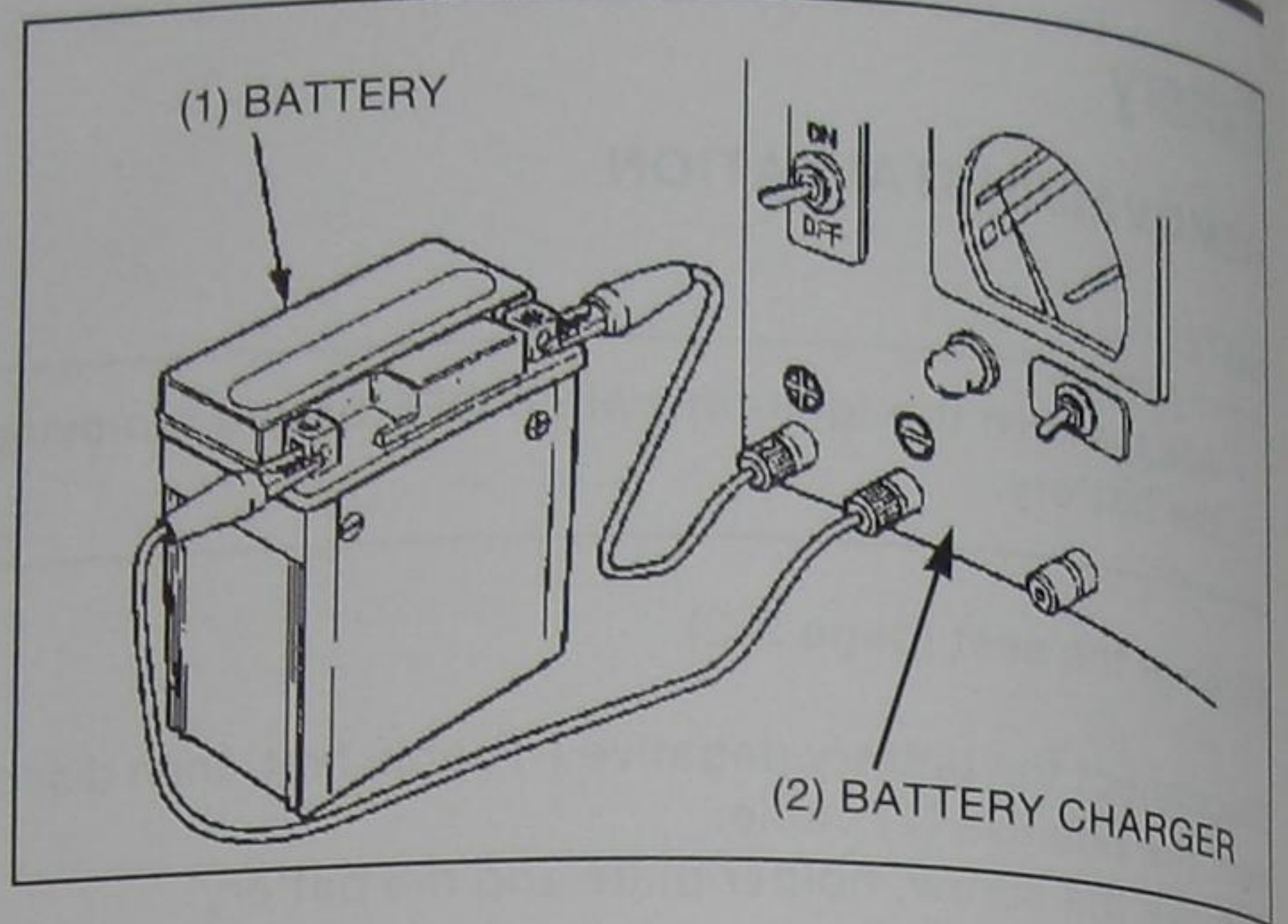
Remove the battery.

Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (-) cable to the battery negative (-) terminal.

**CHARGING CURRENT/TIME:** **Standard: 0.5 A/5-10 h**
**Quick: 5 A/1.0 h**

**CAUTION**

- **Quick charging should only be done in an emergency; slow charging is prefered.**
- **For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.**



## Charging System Inspection

Remove the seat (page 2-2).

### CURRENT LEAKAGE TEST

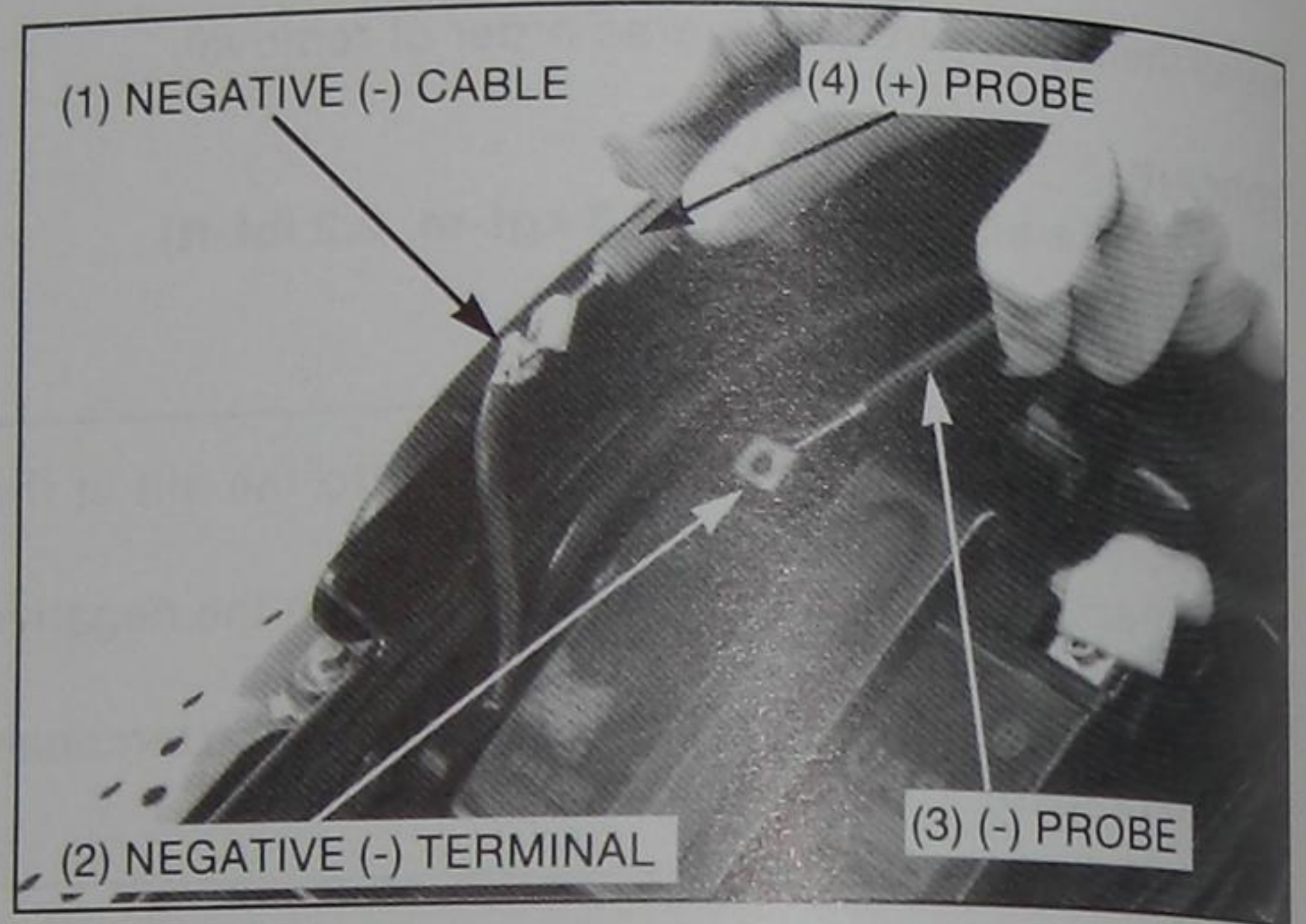
Turn the ignition switch OFF and disconnect the battery negative (-) cable.
Connect the ammeter (+) probe to the battery negative (-) cable and the ammeter (-) probe to the battery negative (-) terminal.
With the ignition switch OFF, check for current leakage.

NOTE:

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition switch ON. A sudden surge of current may blow out the fuse in the tester.

**CURRENT LEAKAGE: 0.1 mA maximum**

If current leakage exceeds the specified value, a shorted circuit is likely.
Locate the short by disconnecting connections one by one and measuring the current.



### REGULATED VOLTAGE INSPECTION

NOTE:

- Be sure that the battery is in good condition before performing this test.

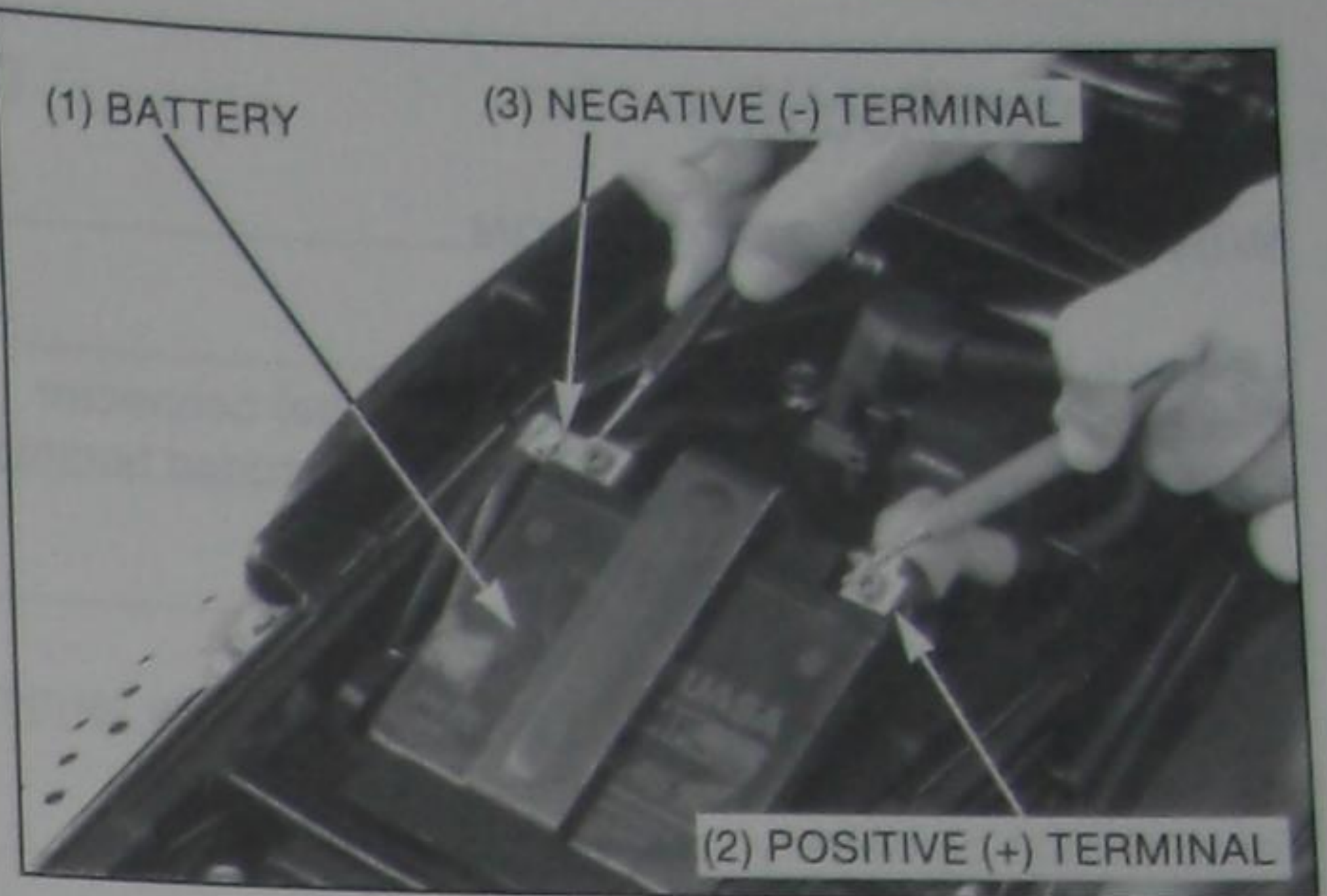
**⚠ WARNING**

- **If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.**

Start the engine and warm it up to the operating temperature; stop the engine.
Connect the multimeter between the positive and negative terminals of the battery.

**CAUTION**

- **To prevent short, make absolutely certain which are the positive and negative terminals or cable.**
- **Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.**



With the headlight high beam, restart the engine.
Measure the voltage on the multitester when the engine runs at 5,000 min$^{-1}$ (rpm)

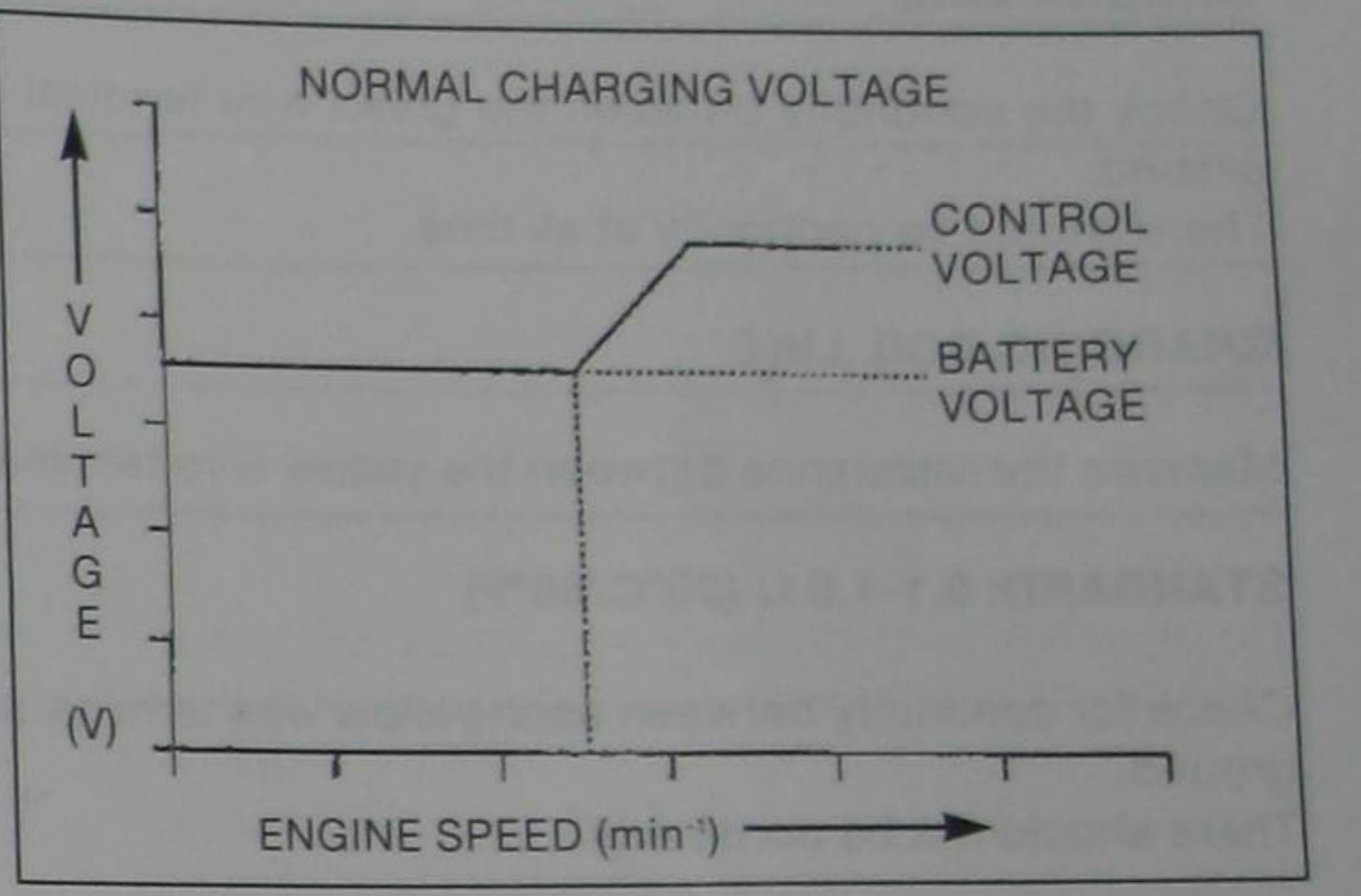
**REGULATED VOLTAGE: 14.0-14.8 V/5,000 min$^{-1}$ (rpm)**

The charging system is normal if the voltage reads the regulated voltage on the tester.

NOTE:

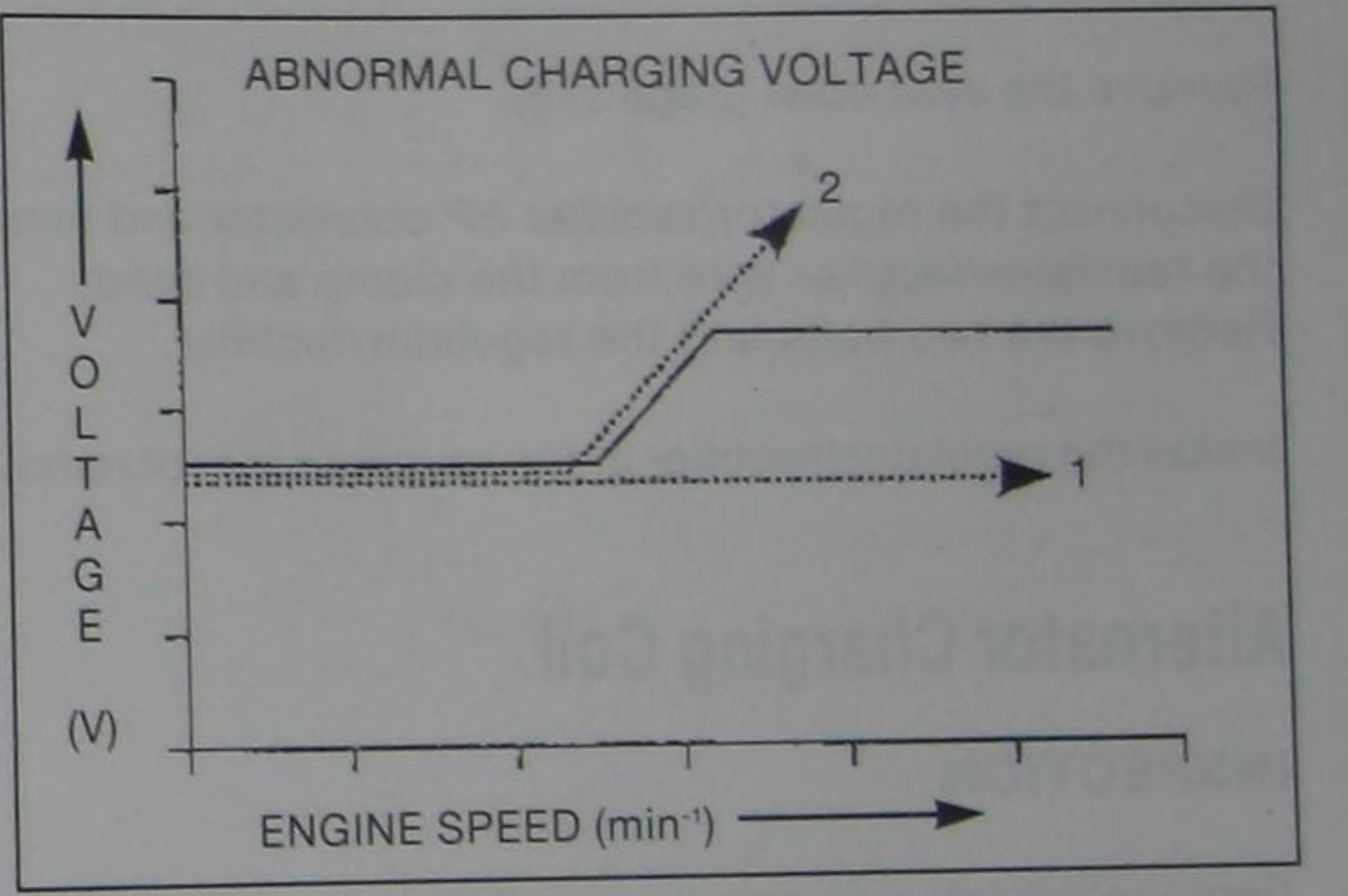
- The speed at which voltage starts to rise cannot be checked as it varies with the temperature and loads on the alternator.

A frequently discharged battery is an indication that it is deteriorated even if it proves normal in the regulated voltage inspection.



The charging circuit may be abnormal if any of the following symptoms is encountered:

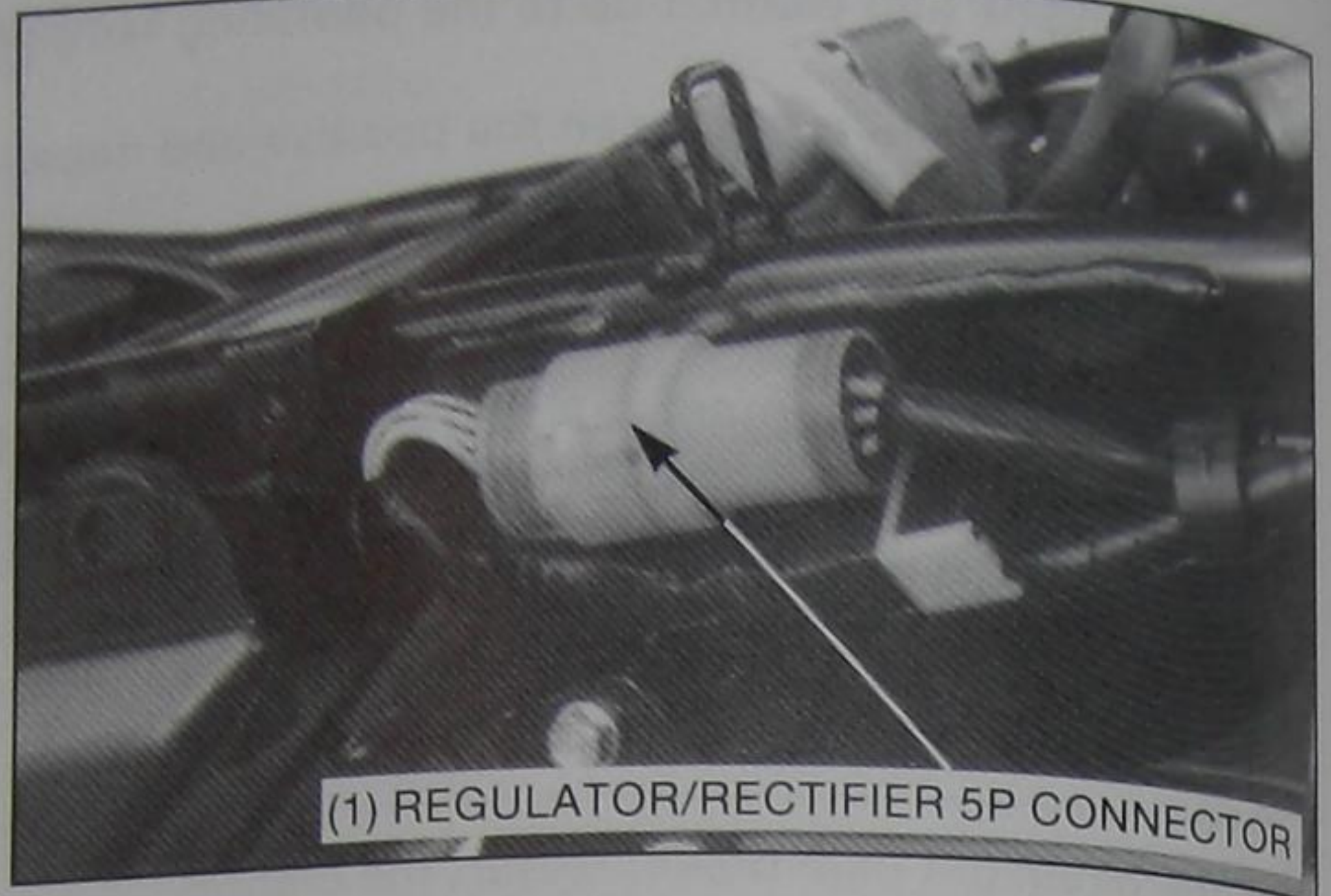
1. Voltage not raised to regulated voltage (page 15-3)
   - Open or short circuit in the charging system wire harness or poorly connected connector
   - Open or shorted alternator
   - Faulty regulator/rectifier
2. Regulated voltage too high (page 15-4)
   - Poorly grounded regulator/rectifier
   - Faulty battery
   - Faulty regulator/rectifier



## Regulator/Rectifier

### WIRE HARNESS INSPECTION

Remove the seat cowl (page 2-3).
Disconnect the regulator/rectifier 5P (white) connector.
Check the connector for loose contact or corroded terminals.



**BATTERY LINE**

Measure the voltage between the red/white wire terminal and ground.
There should be battery voltage at all time.

**GROUND LINE**

Check the continuity between the green wire terminal and ground.
There should be continuity at all time.

**CHARGING COIL LINE**

Measure the resistance between the yellow wire terminals.

**STANDARD: 0.1-1.0 Ω (20°C/68°F)**

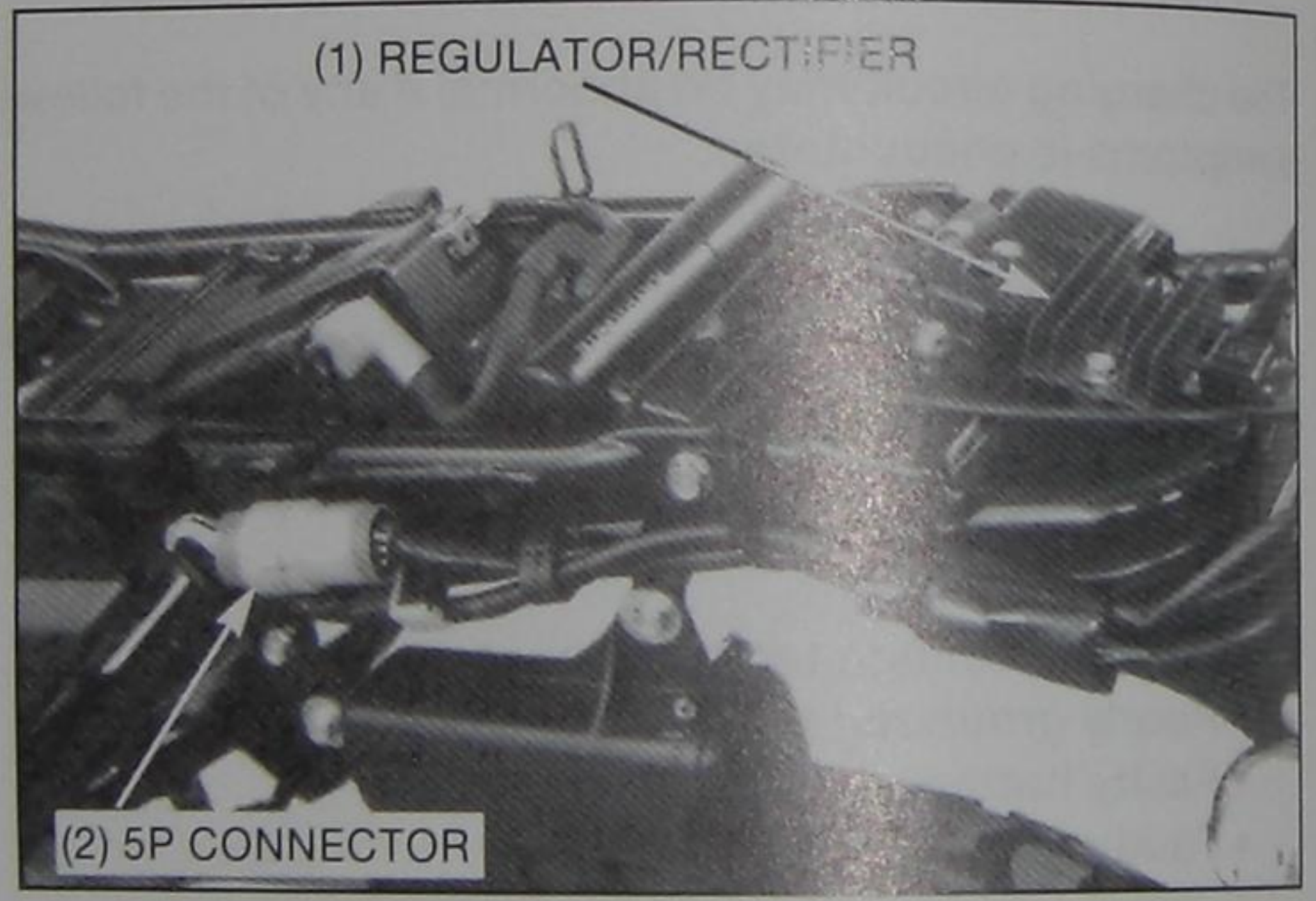
Check for continuity between each yellow wire terminal and ground.
There should not be continuity.

### REMOVAL/INSTALLATION

Remove the seat cowl (page 2-3).

Disconnect the regulator/rectifier 5P connector and remove the regulator/rectifier wire from the clamp and band.
Remove the two bolts and the regulator/rectifier.

Install the regulator/rectifier in the reverse order of removal.



## Alternator Charging Coil

### INSPECTION

Remove the left side cover (page 2-3).

Disconnect the alternator 3P (black) connector.

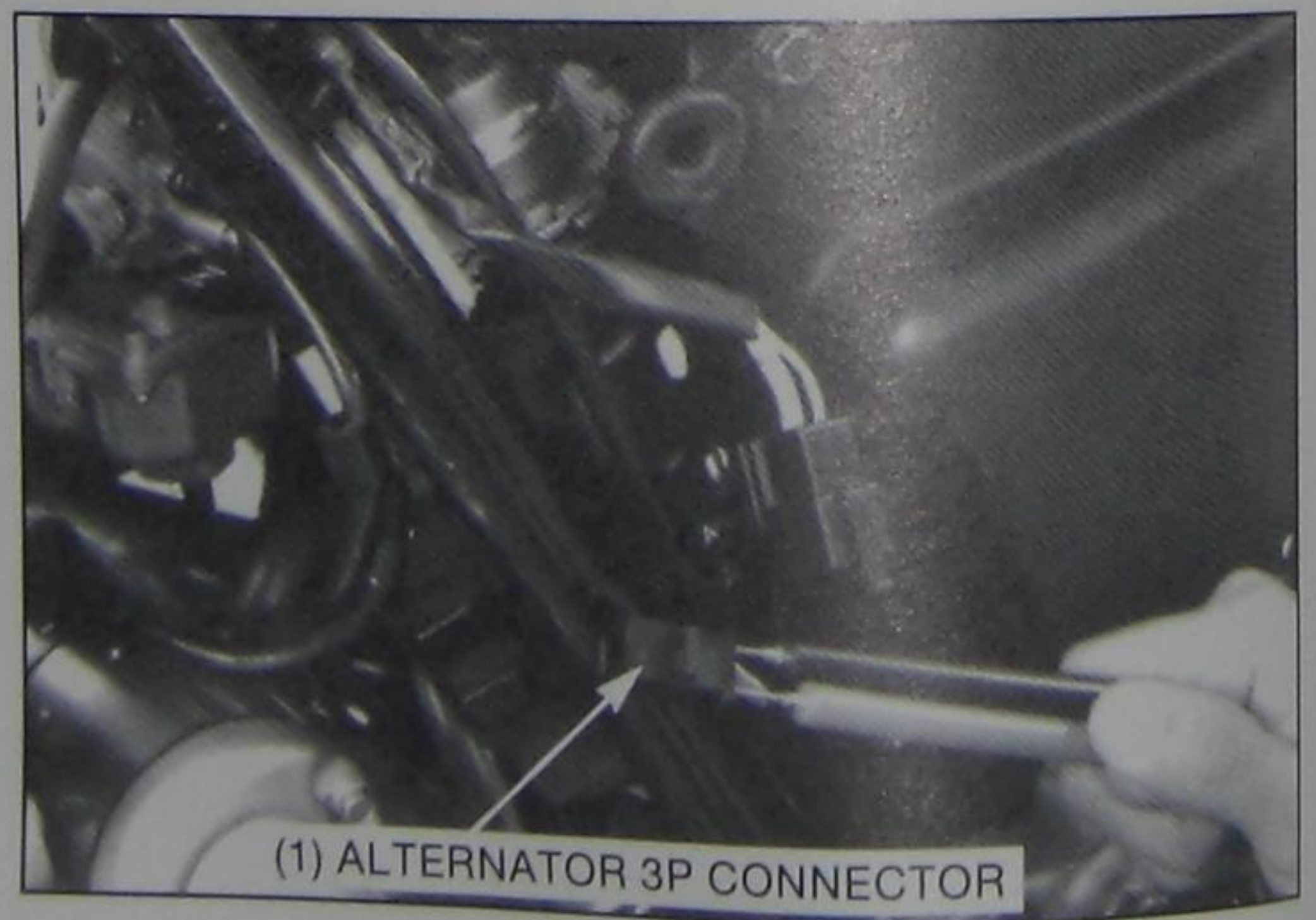
Measure the resistance between the wire terminals of the alternator side connector.

**STANDARD: 0.1-1.0 Ω (20°C/68°F)**

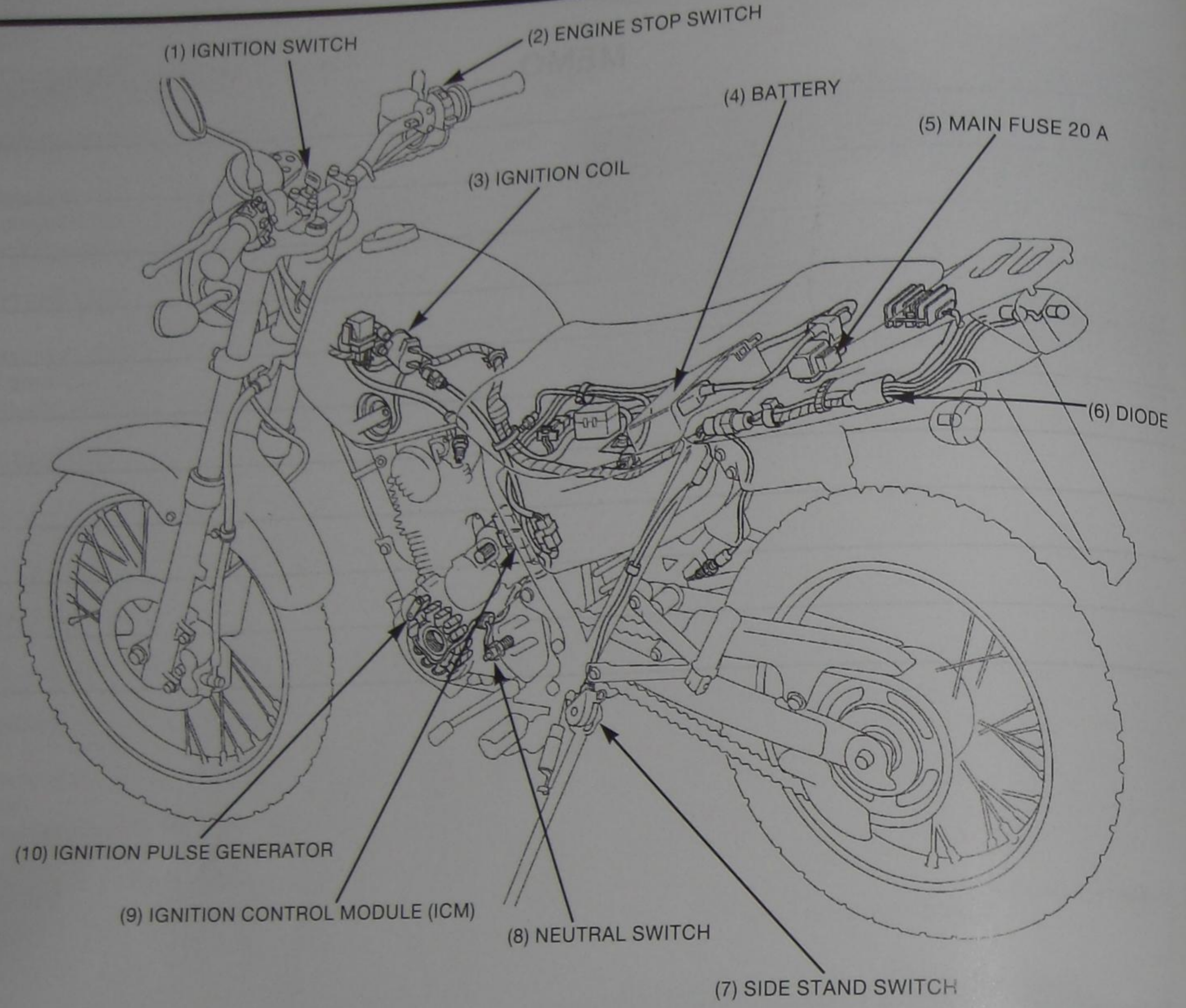
Check for continuity between each wire terminal of the alternator side connector and ground.
There should be no continuity.

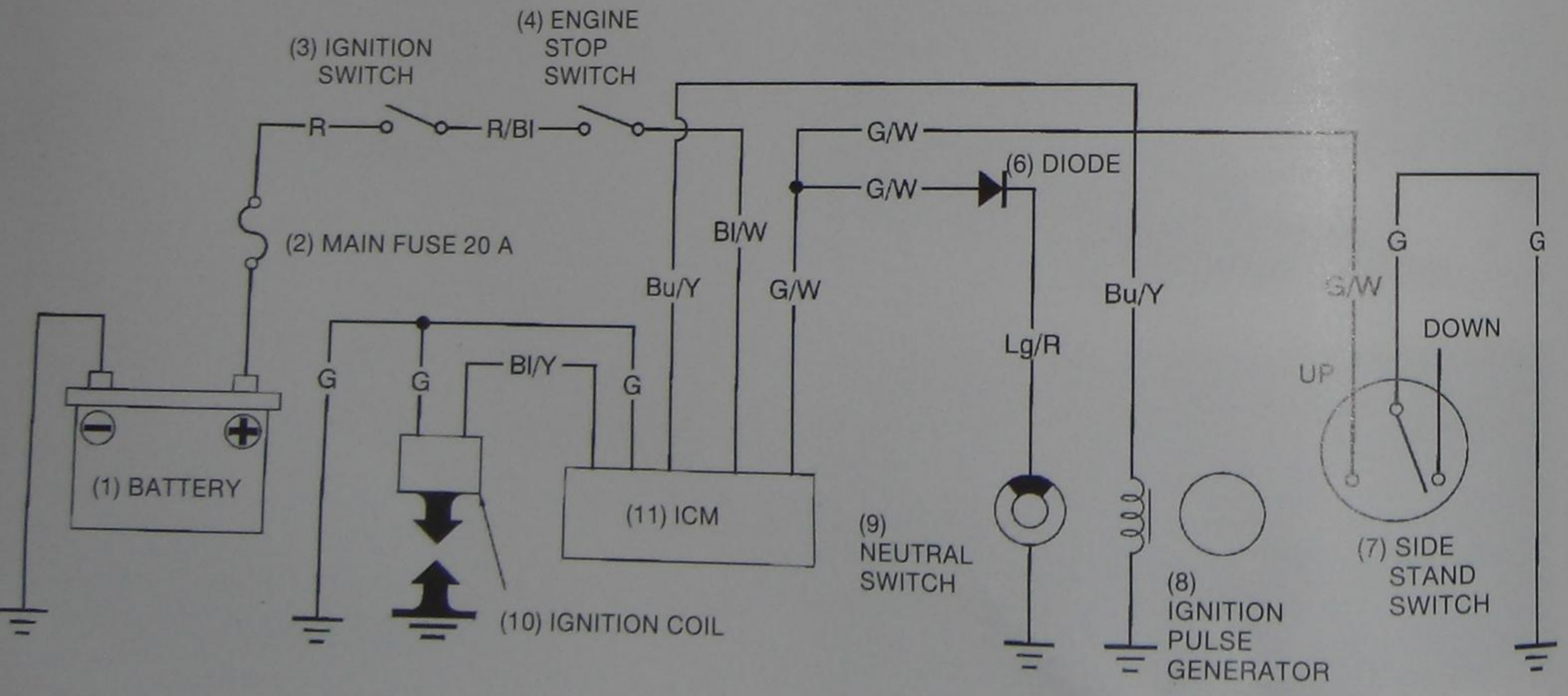
Replace the alternator stator if resistance is out of specification, or if any wire has continuity to ground.

Refer to section 10 for alternator stator replacement.



## MEMO


(1) IGNITION SWITCH
(2) ENGINE STOP SWITCH
(4) BATTERY
(5) MAIN FUSE 20 A
(3) IGNITION COIL
(6) DIODE
(10) IGNITION PULSE GENERATOR
(9) IGNITION CONTROL MODULE (ICM)
(8) NEUTRAL SWITCH
(7) SIDE STAND SWITCH


(3) IGNITION SWITCH
(4) ENGINE STOP SWITCH
R
R/Bl
G/W
G/W
(6) DIODE
(2) MAIN FUSE 20 A
Bl/W
Bu/Y
G/W
Lg/R
Bu/Y
G/W
G
G
DOWN
UP
G
G
Bl/Y
G
(1) BATTERY
(11) ICM
(9) NEUTRAL SWITCH
(8) IGNITION PULSE GENERATOR
(7) SIDE STAND SWITCH
(10) IGNITION COIL

Bl . . . .BLACK
Y . . . . .YELLOW
Bu . . . .BLUE
G . . . .GREEN
R . . . .RED
W . . . .WHITE
Lg . . . .LIGHT GREEN

# 16. Ignition System

| | | | |
|---|---|---|---|
| SERVICE INFORMATION | 16-1 | IGNITION TIMING | 16-4 |
| TROUBLESHOOTING | 16-2 | IGNITION COIL | 16-5 |
| IGNITION SYSTEM INSPECTION | 16-3 | IGNITION CONTROL MODULE (ICM) | 16-5 |

## Service Information

### GENERAL

**CAUTION**

- **Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is On and current is present.**

- When servicing the ignition system, always follow the steps in the troubleshooting on page 16-2.
- The ignition timing does not normally need to be adjusted since the ignition control module (ICM) is factory preset.
- The ICM may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the ICM. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding.
- Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plugs.
- Use a spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
- For spark plug inspection, see section 3.
- For ignition pulse generator (alternator stator) removal/installation, see section 10.
- See section 18 for following components:
  - Ignition switch
  - Engine stop switch
  - Neutral switch
  - Side stand switch

### SPECIFICATIONS

| Item | | Specifications |
|---|---|---|
| Spark plug | NGK | DPR8EA-9 |
| | DENSO | X24EPR-U9 |
| Spark plug gap | | 0.8-0.9 mm (0.031-0.035 in) |
| Ignition coil peak voltage | | 100 V minimum |
| Ignition pulse generator peak voltage | | 0.7 V minimum |
| Ignition timing ("F" mark) | | 15° BTDC at idle |

### TORQUE VALUE

| | |
|---|---|
| Timing hole cap | 10 N·m (1.0 kgf-m, 7lbf-ft) |

### TOOLS

| | |
|---|---|
| Imrie diagnostic tester (model 625) or Peak voltage adaptor | 07HGJ-0020100 with commercially available digital multitester (impedance 10 MΩ/DCV minimum) |

## Troubleshooting

Inspect the following before diagnosing the system.
- Faulty spark plug
- Loose spark pug cap or spark plug wire connections
- Water got into the spark plug cap (Leaking the ignition coil secondary voltage)

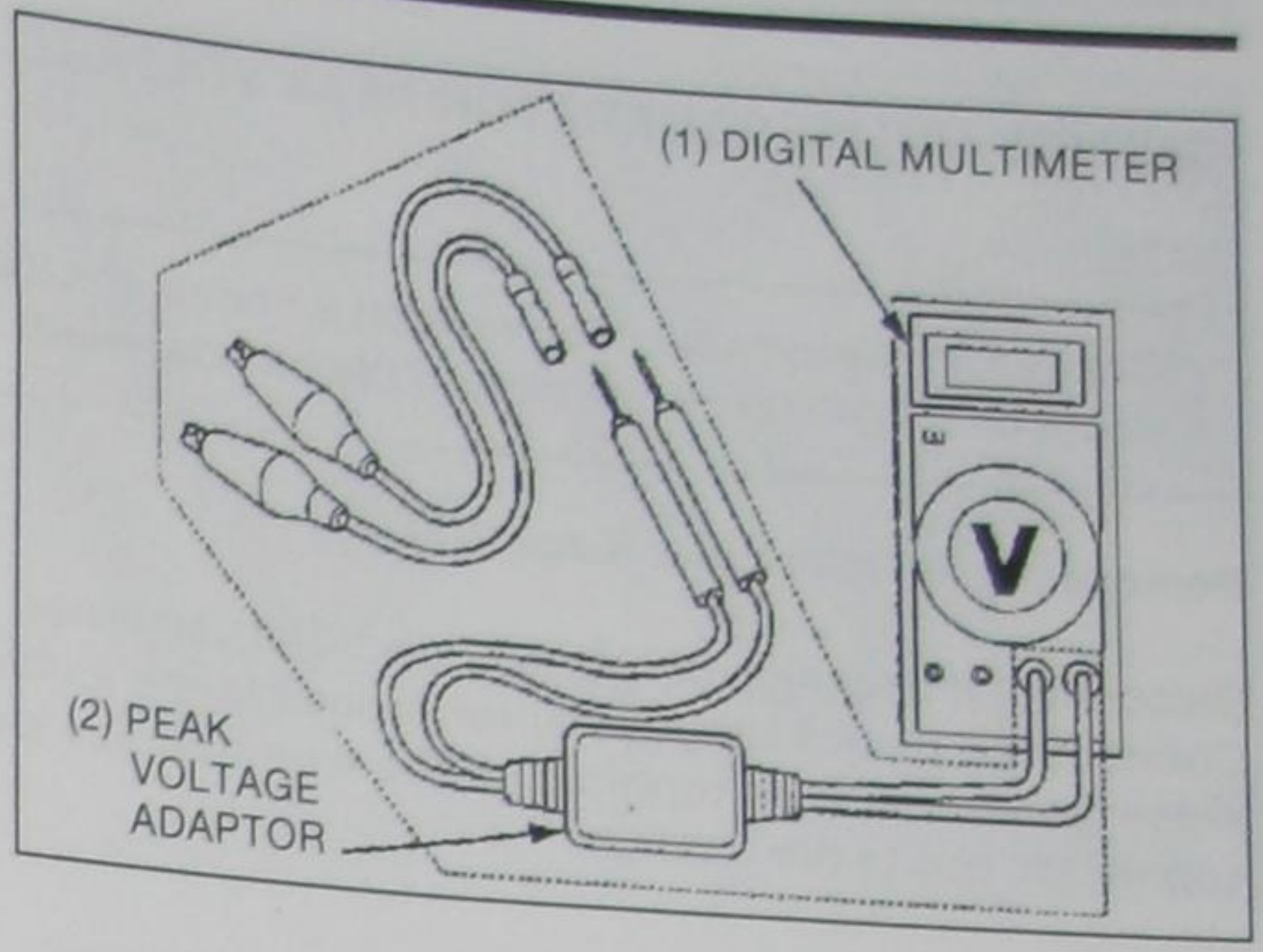
**No spark at spark plug**

| Unusual condition | | Probable cause (Check in numerical order) |
|---|---|---|
| Ignition coil primary voltage | Low peak voltage | 1. Incorrect peak voltage adaptor connections. (System is normal if measured voltage is over the specifications with reverse connections.)<br>2. The multimeter impedance is too low; below 10MΩ/DCV.<br>3. Cranking speed is too low. (Battery is undercharged.)<br>4. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.)<br>5. Poorly connected connectors or an open circuit in ignition system.<br>6. Faulty side stand switch or neutral switch.<br>7. An open circuit or loose connection in No. 6 related circuit.<br>• Side stand switch line: green/white wire<br>• Neutral switch line: light green/red wire<br>8. Faulty ignition coil.<br>9. Faulty ignition control module (ICM). (In case when above No. 1 thru. 8 are normal.) |
| | No peak voltage | 1. Incorrect peak voltage adaptor connections. (System is normal if measured voltage is over the specifications with reverse connections.)<br>2. Battery is undercharged. (Voltage drops largely when the engine is started.)<br>3. Faulty ignition switch or engine stop switch.<br>4. Loose or poorly connected ICM connector.<br>5. No voltage at the black/white wire of the ICM.<br>6. Open circuit or poor connection in ground (green) wire of the ICM.<br>7. Faulty side stand switch or neutral switch.<br>8. An open circuit or loose connection in No. 6 related circuit.<br>• Side stand switch line: green/white wire<br>• Neutral switch line: light green/red wire<br>9. Faulty peak voltage adaptor.<br>10. Faulty ignition pulse generator. (Measure peak voltage.)<br>11. Faulty ICM. (In case when above No. 1 thru. 10 are normal.) |
| | Peak voltage is normal, but no spark jumps at plug | 1. Faulty spark plug or leaking ignition coil secondary current ampere.<br>2. Faulty ignition coil. |
| Ignition pulse generator | No peak voltage | 1. The multimeter impedance is too low; 10MΩ/DCV.<br>2. Cranking speed is too slow. (Battery is undercharged.)<br>3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.)<br>4. Faulty ignition pulse generator. (In case when above No. 1 thru. 3 are normal). |
| | Low peak voltage | 1. Faulty peak voltage adaptor.<br>2. Faulty ignition pulse generator. |

## Ignition System Inspection

NOTE:

- If no spark jumps at the plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use a commercially available digital multimeter (impedance 10 MΩ/DCV minimum).
- The display value differs depending upon the internal impedance of the multimeter.
- If the Imrie diagnostic tester (model 625) is used, follow the manufacturer's instructions.



Connect the peak voltage adaptor to the digital multimeter.

**TOOL:**
**Imrie diagnostic tester (model 625) or**
**Peak voltage adaptor 07HGJ-0020100**
**with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)**

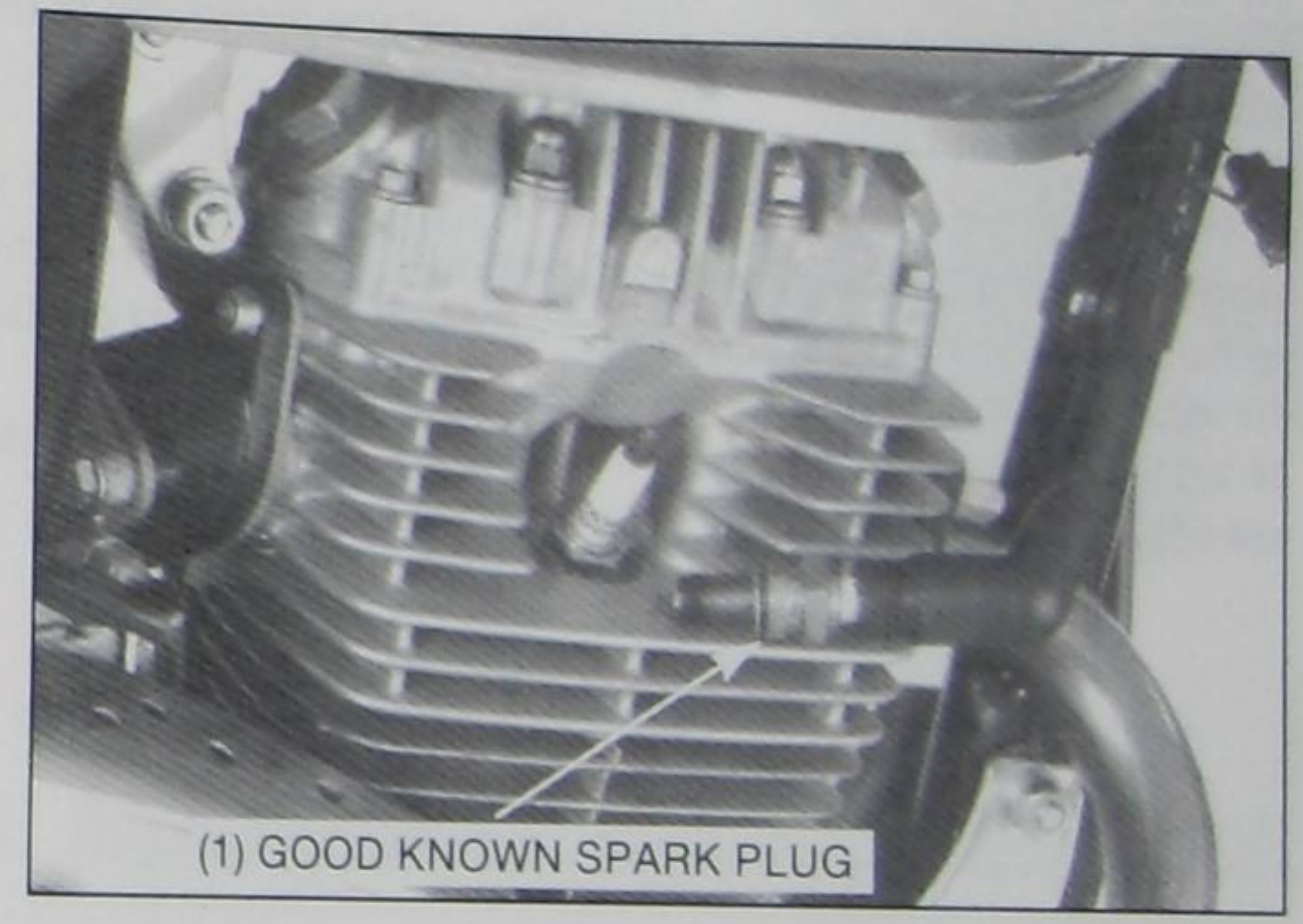
### IGNITION PRIMARY PEAK VOLTAGE

NOTE:

- Check all system connections before this inspection. Poor connected connectors can cause incorrect readings.
- Check that the cylinder compression is normal and check that the spark plug is installed correctly in the cylinder head.

Remove the fuel tank (page 2-2).

Disconnect the spark plug cap from the spark plug. Connect a good know spark plug to the spark plug cap and ground it to the cylinder head as done in a spark test.



With the connector connected, connect the peak voltage adaptor probes to the ignition coil primary terminal and ground.

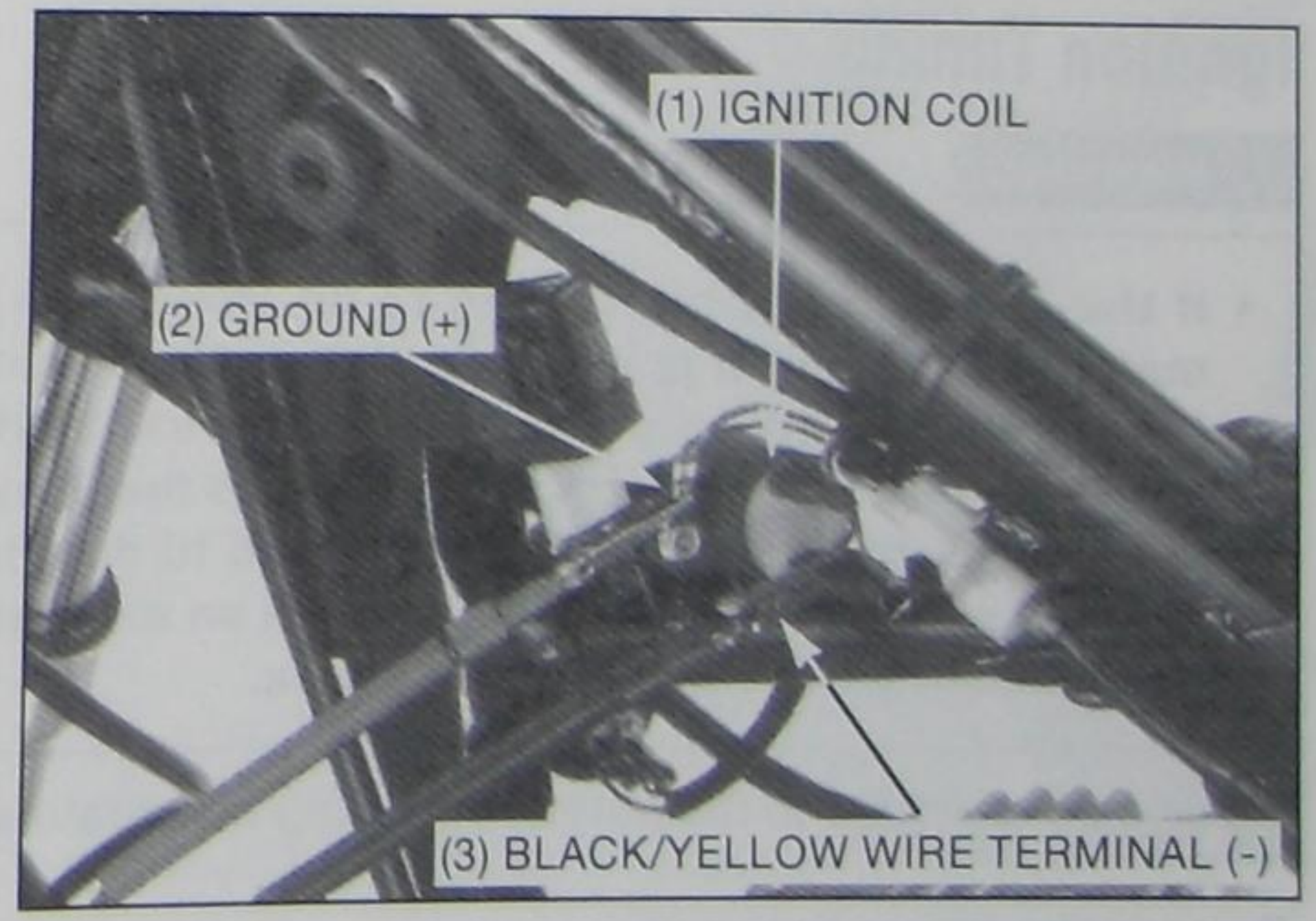
**Connection:**
**Black/yellow wire terminal (-) — ground (+)**

Turn the ignition switch ON and engine stop switch to RUN. Shift the transmission into neutral. Crank the engine with the starter motor and read the ignition coil primary voltage.

**PEAK VOLTAGE: 100 V minimum**

**⚠ WARNING**

- **Avoid touching the spark plug and tester probes to prevent electric shock.**



If the peak voltage is lower than the standard value, follow the checks described in the troubleshooting on page 16-2.

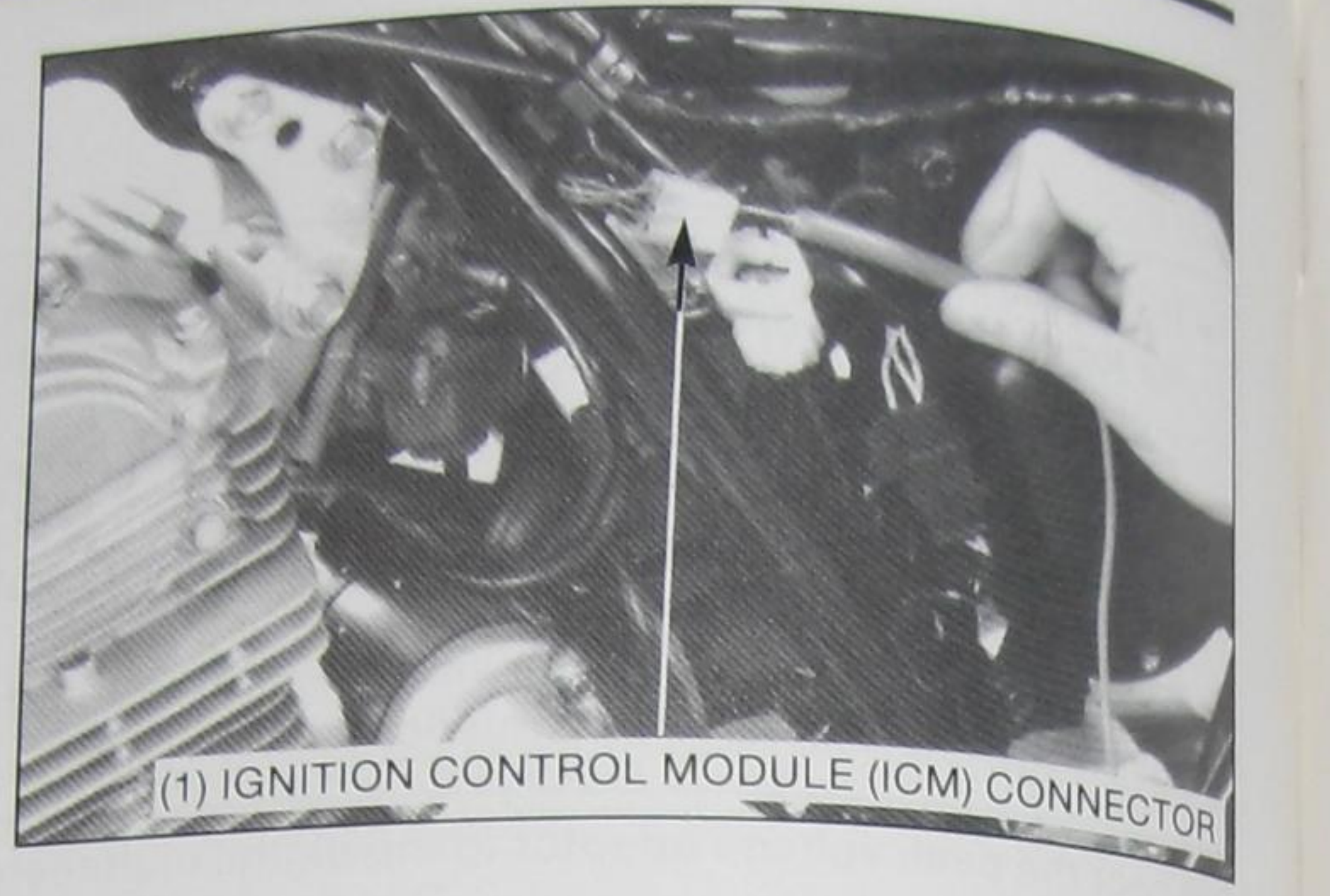
### IGNITION PULSE GENERATOR PEAK VOLTAGE

NOTE:

- Check that the cylinder compression is normal and the spark plug is installed correctly in the cylinder head.

Remove the left side cover (page 2-3).

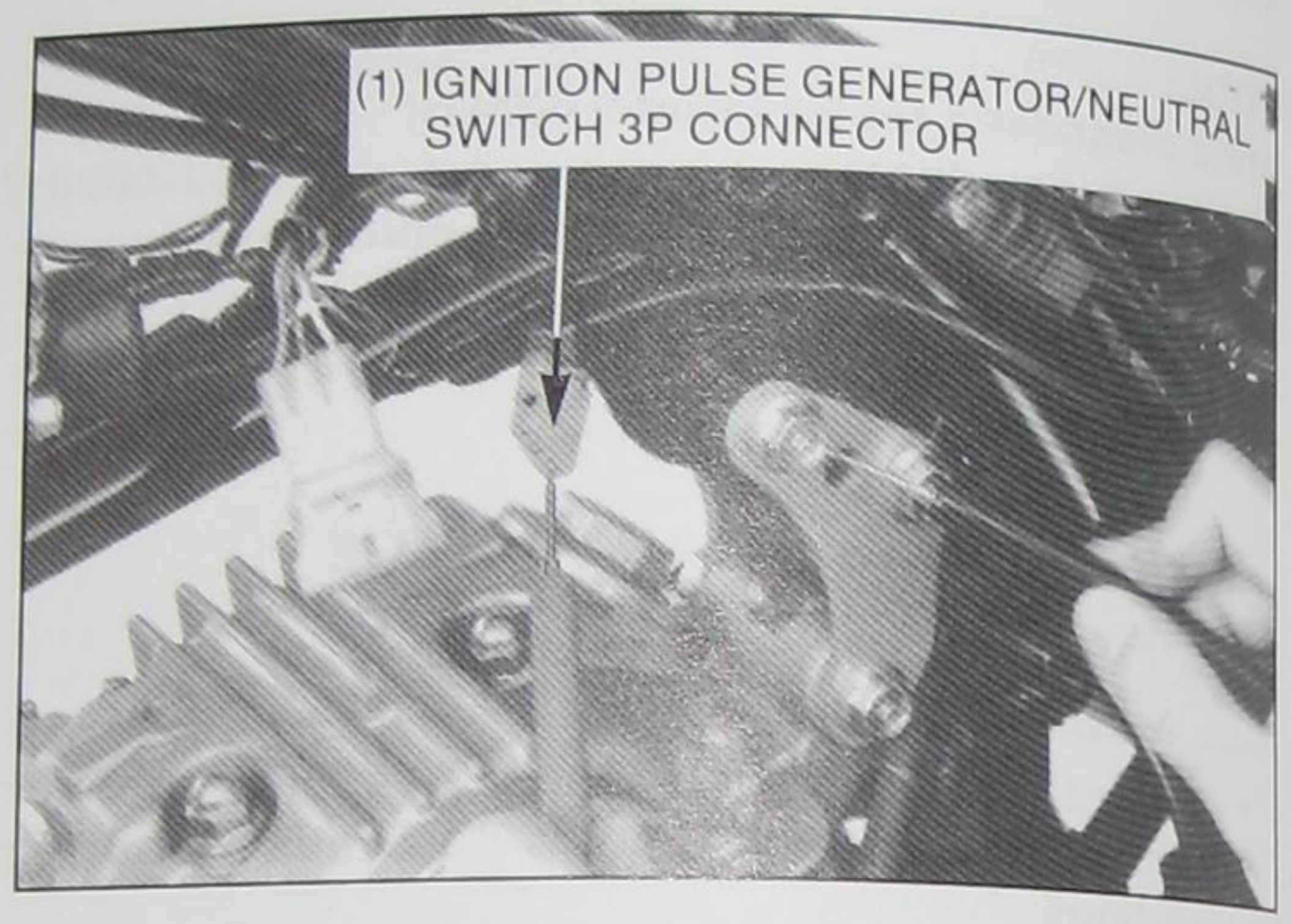
Disconnect the ignition control module (ICM) connector. Connect the peak voltage adaptor probes to the ignition pulse generator wire terminal of the wire harness side connector and to the ground.



**CONNECTION:**
**Blue/yellow wire terminal (+) — ground (-)**

Turn the ignition switch ON and engine stop switch to RUN. Crank the engine with the starter motor and read the peak voltage.

**PEAK VOLTAGE: 0.7 V minimum**



If the peak voltage measured at the ICM connector is abnormal, disconnect the ignition pulse generator 3P (white) connector and connect the adaptor probes to the ignition pulse generator wire terminal of the ignition pulse generator side connector and to the ground.
In the same manner as the ICM connector, measure the peak voltage and compare it to the voltage measured at the ICM connector.

If the peak voltage measured at the ICM connector is abnormal and the one measured at the alternator connector is normal, the blue/yellow wire has an open or short circuit, or loose connections.
If both peak voltages are abnormal, follow the checks described in the troubleshooting on page 16-2.

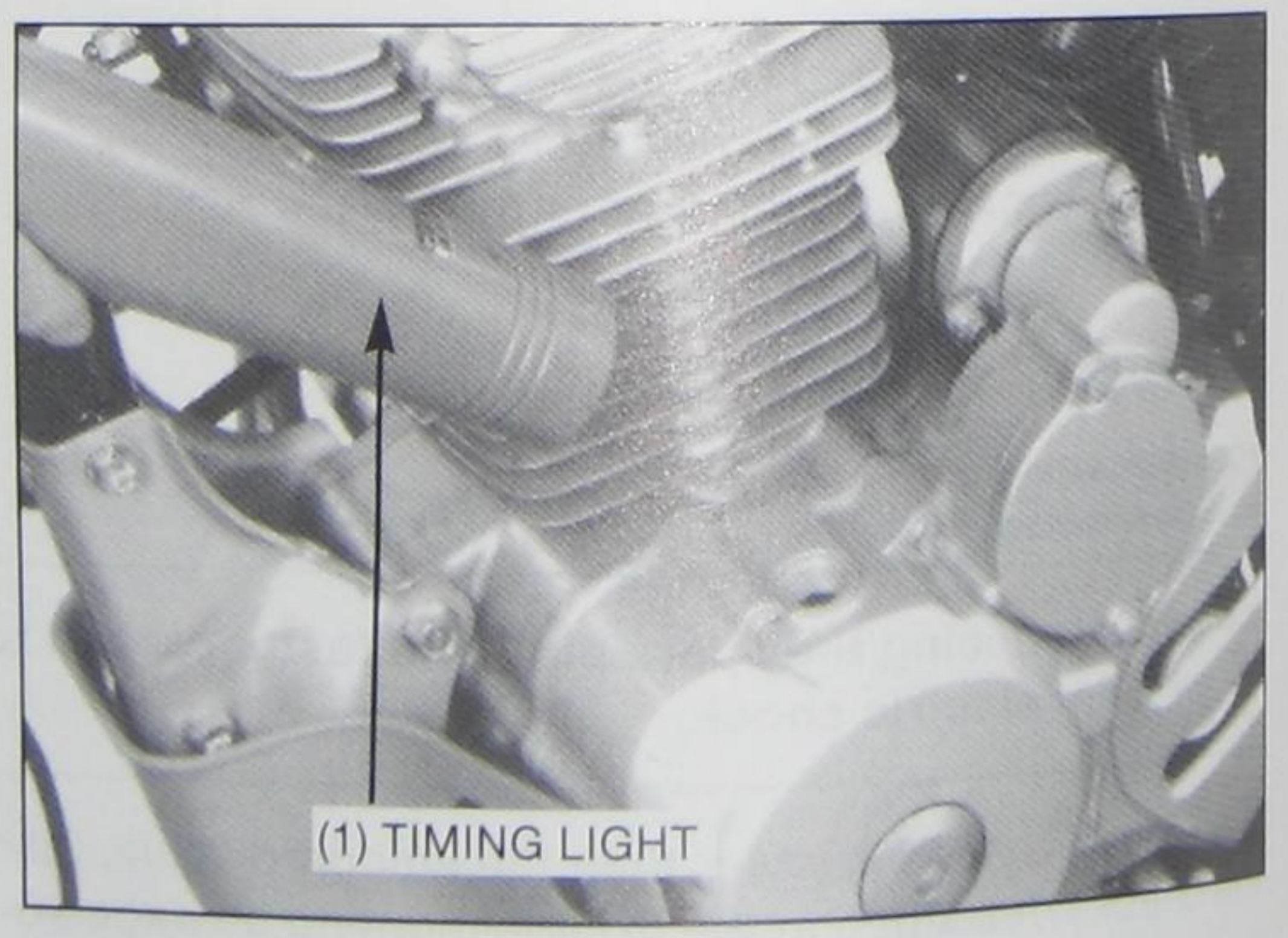
## Ignition Timing

**⚠ WARNING**

- **If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contain poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.**

Warm up the engine to the normal operating temperature,

Remove the timing hole cap.



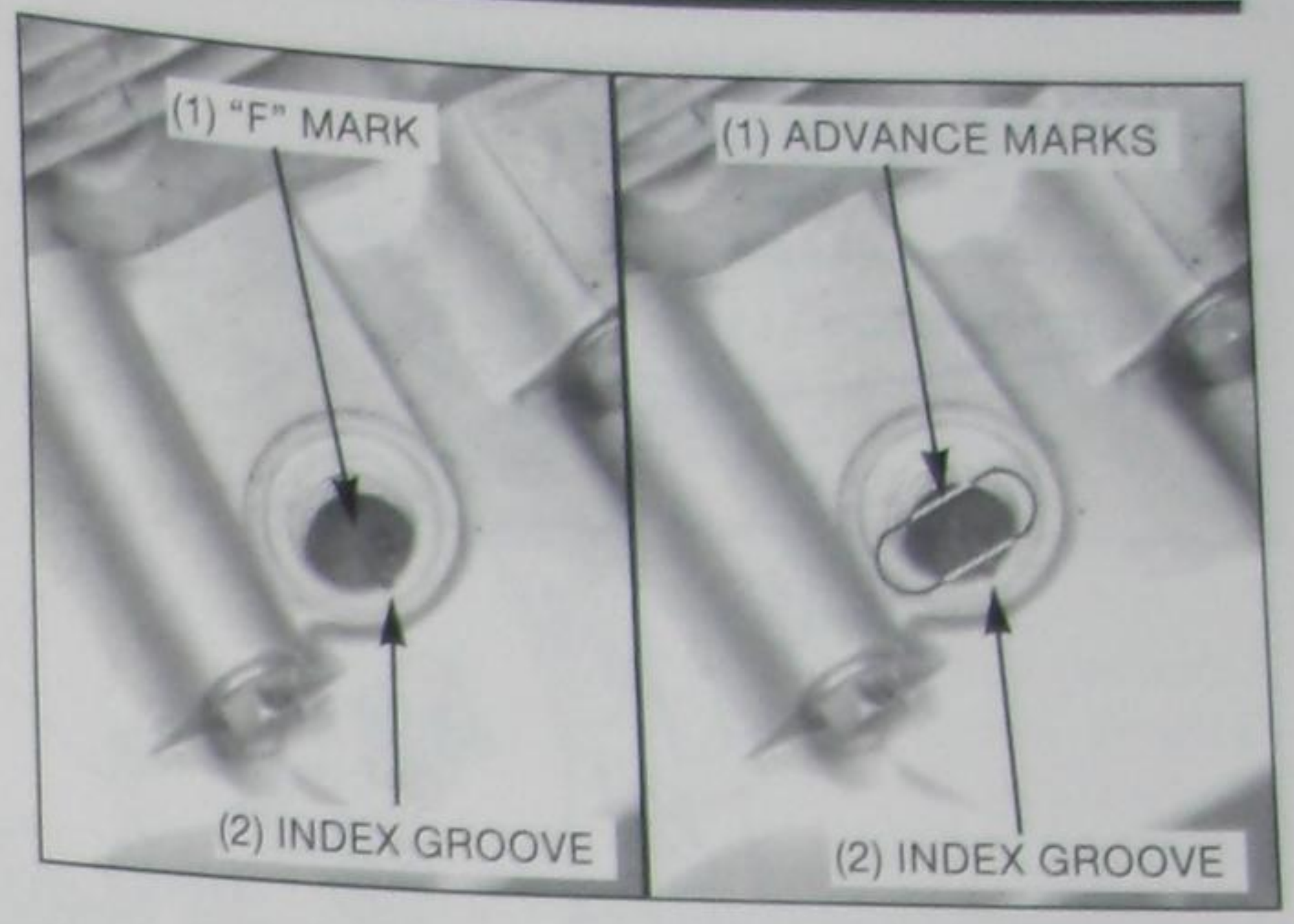
Connect a timing light and a tachometer.

NOTE:

- Read the manufacturer's instructions for the timing light and tachometer.

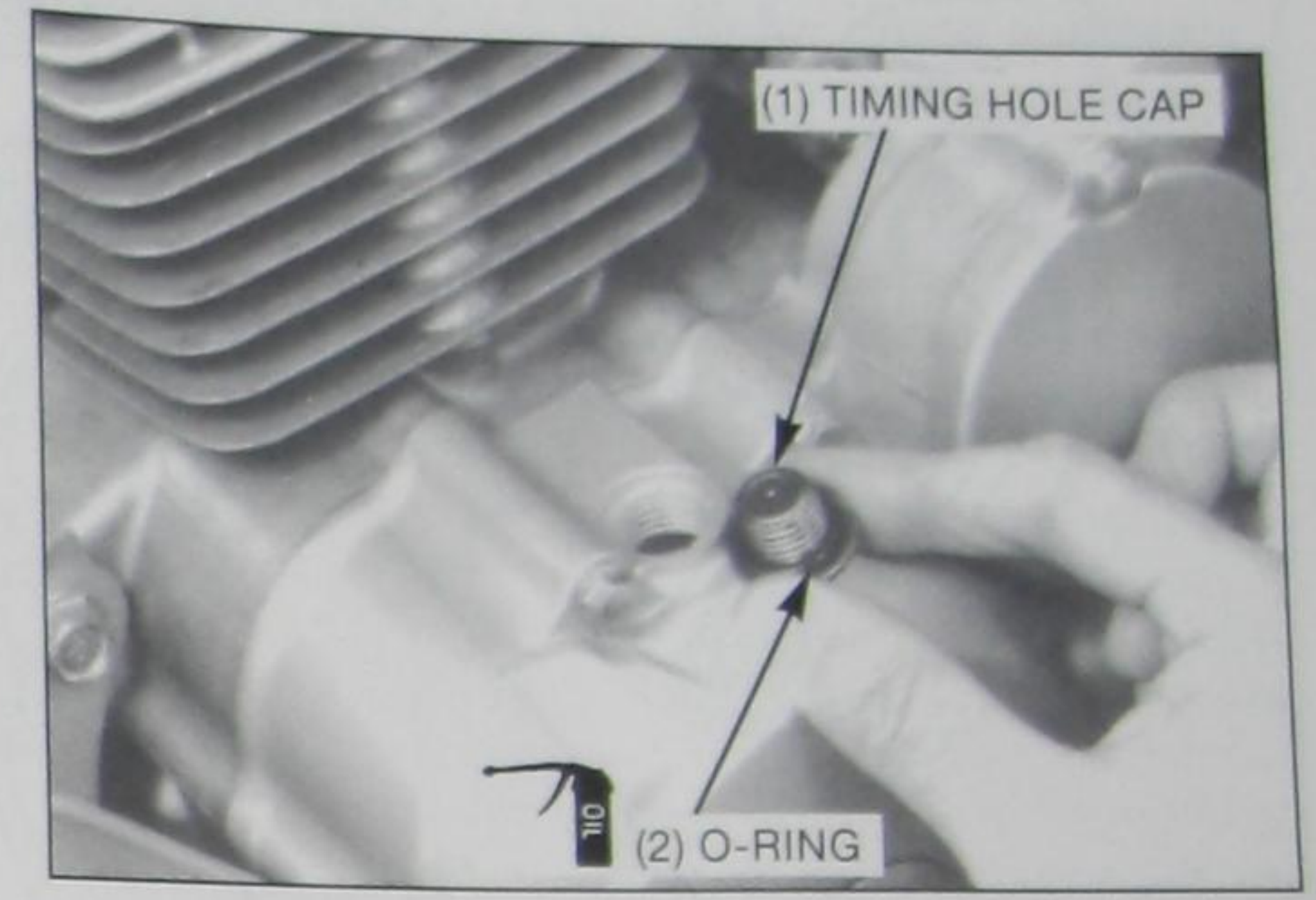
The ignition timing is correct if the F mark on the flywheel aligns with the index groove on the left crankcase cover at idle.

Increase the engine speed and check the ignition timing at full advance.
The index groove should be between the advance marks.



Make sure that the O-ring on the timing hole cap is in good condition.
Apply oil to the O-ring, install the timing hole cap and tighten it.

**TORQUE: 10 N·m (1.0 kgf-m, 7 lbf-ft)**



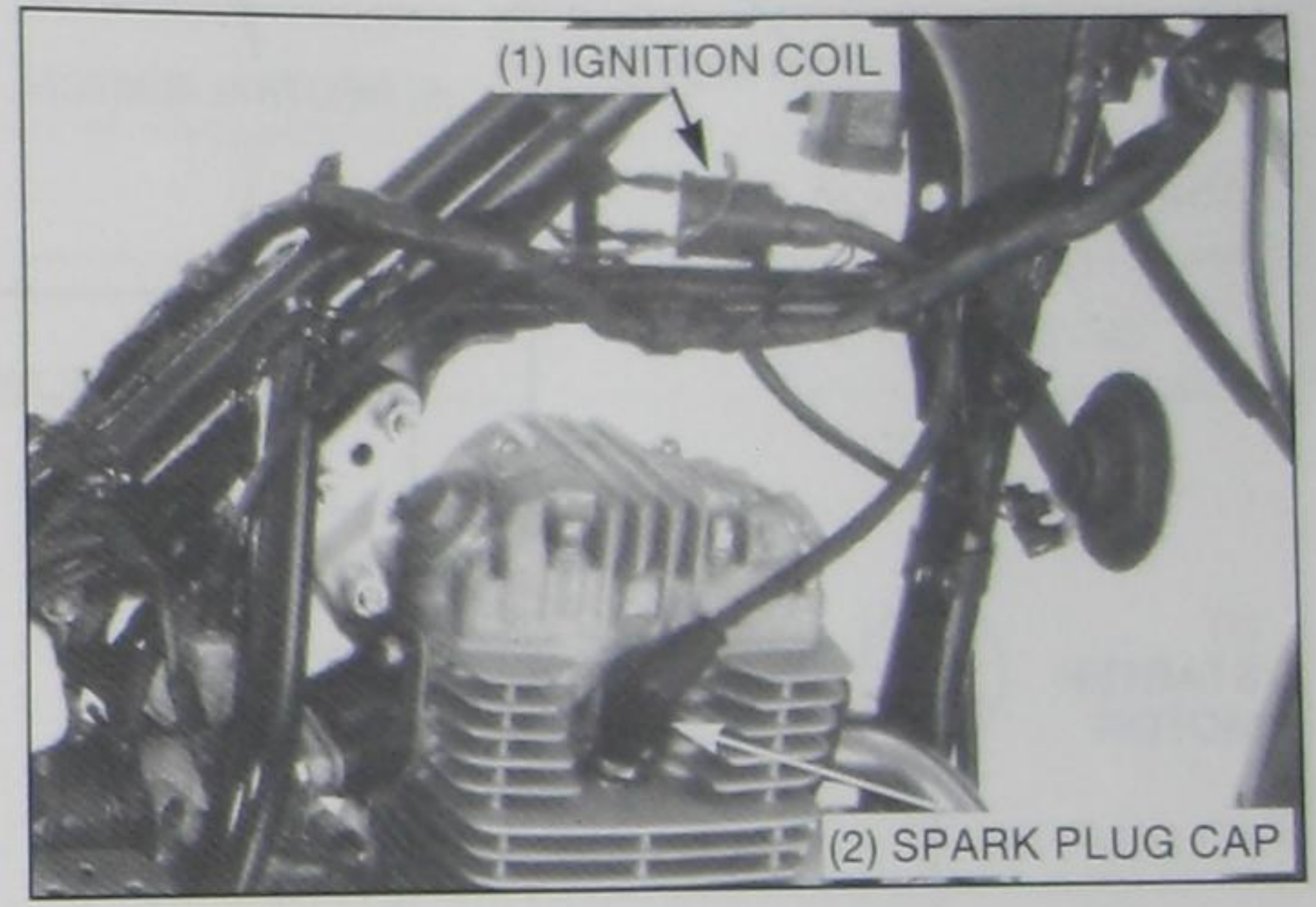
## Ignition Coil

### REMOVAL/INSTALLATION

Remove the fuel tank (page 2-2).

Remove the spark plug cap from the spark plug.
Disconnect the ignition coil primary wire connectors.
Remove the mounting bolt, ground wire and the ignition coil from the frame.

Install the ignition coil in the reverse order of removal.



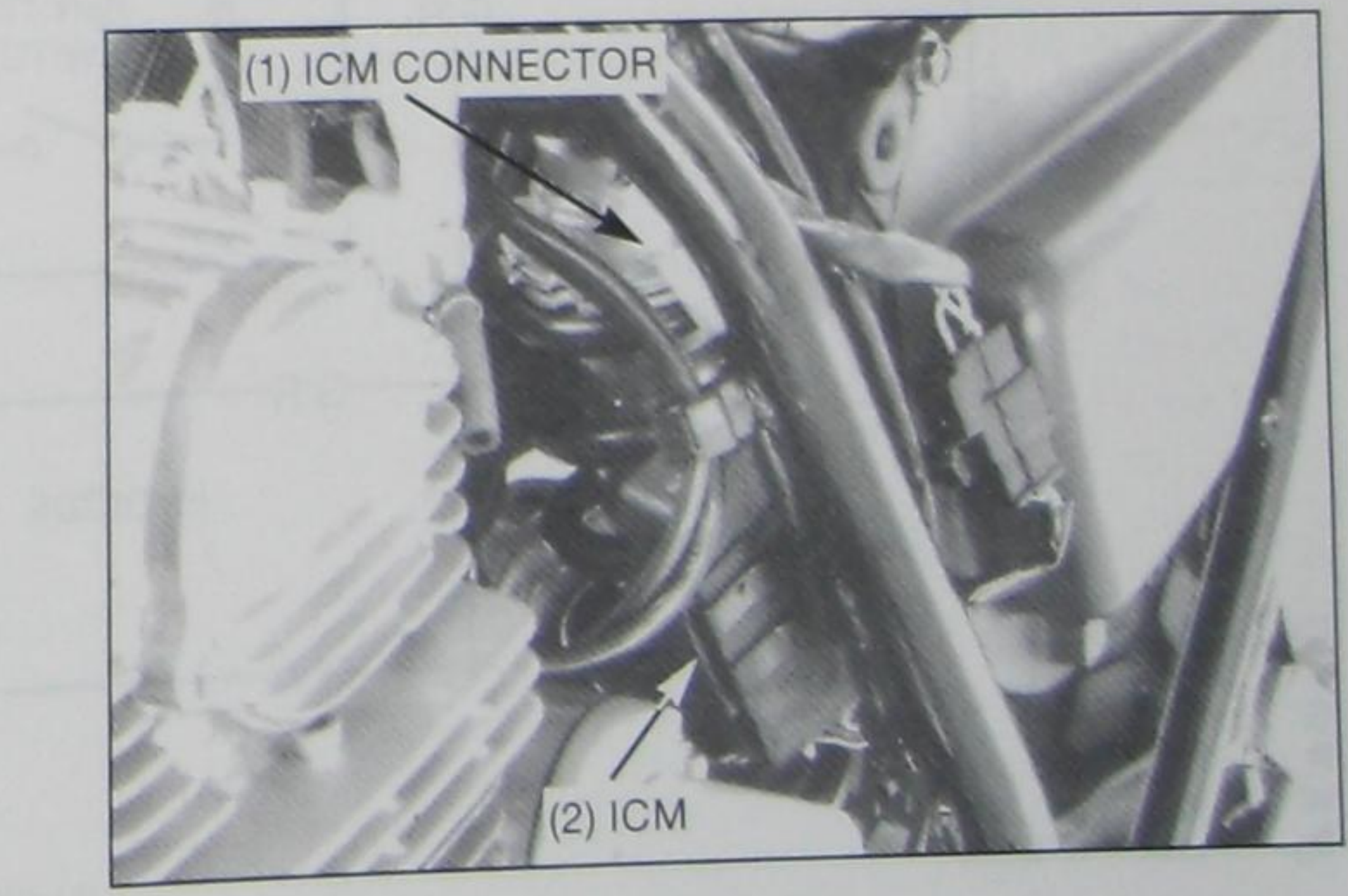
## Ignition Control Module (ICM)

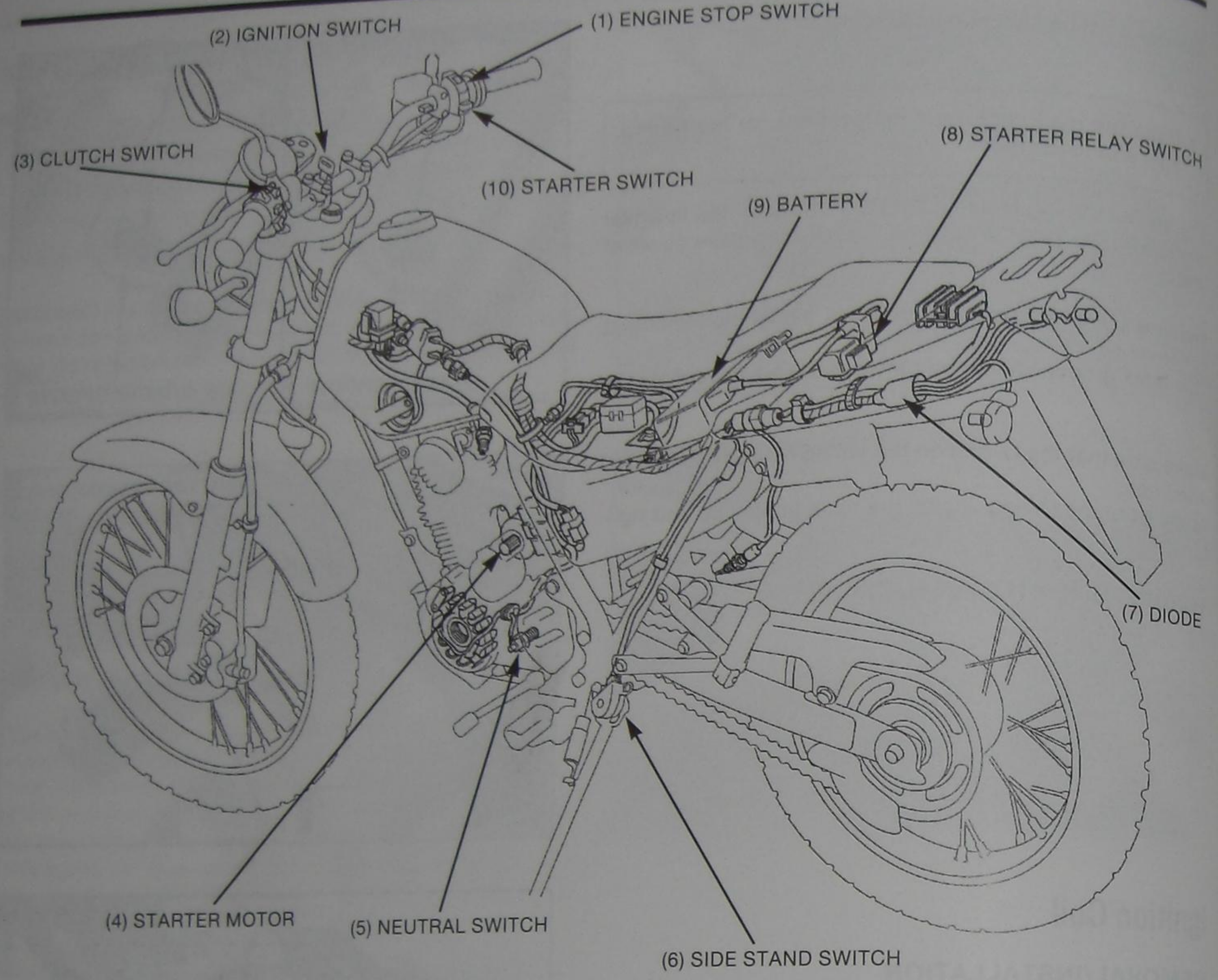
### REMOVAL/INSTALLATION

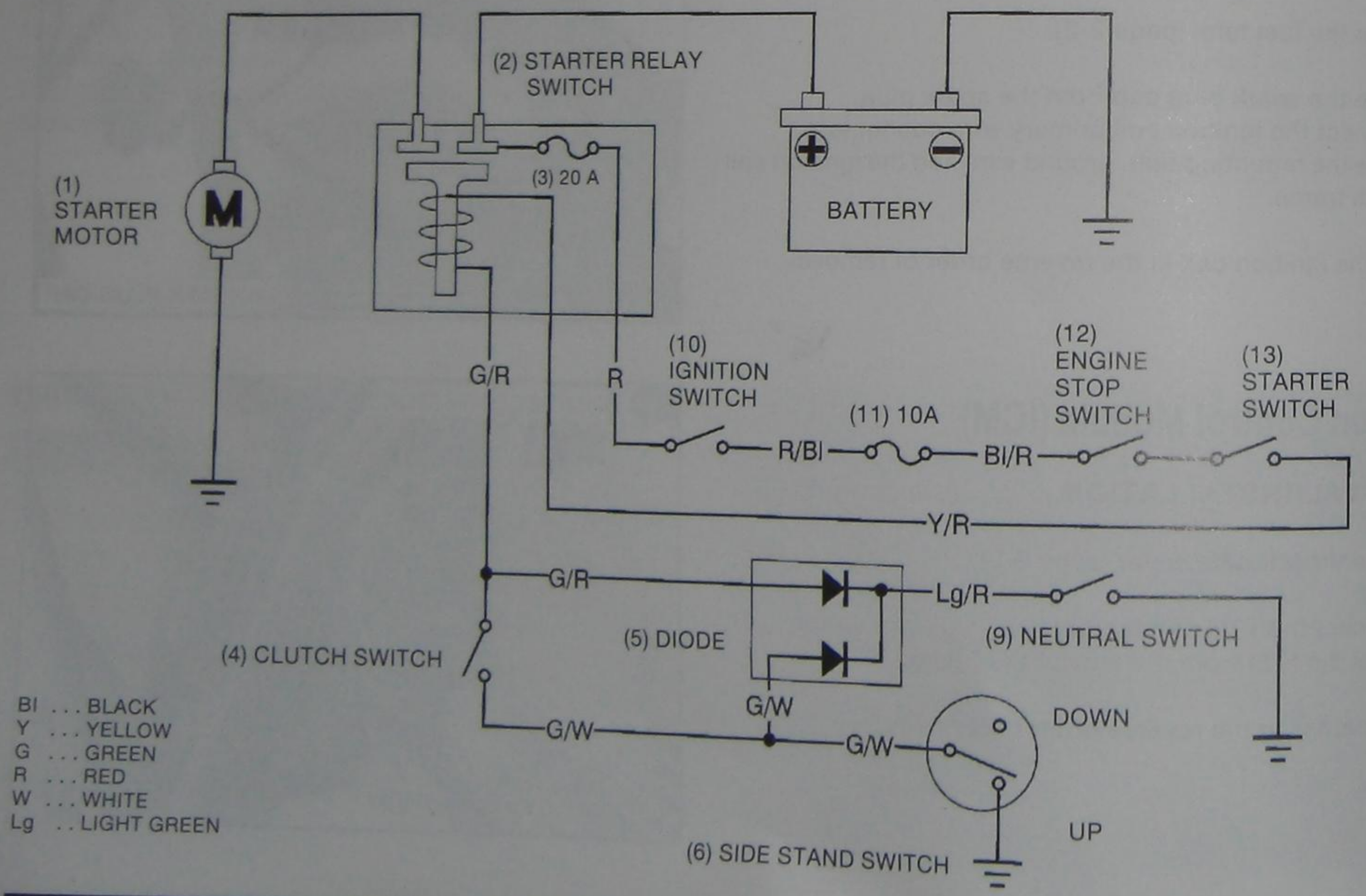
Remove the left side cover (page 2-3).

Disconnect the ICM connectors.
Remove the ICM from the stay of the frame.

Installation is in the reverse order of removal.




(2) IGNITION SWITCH
(1) ENGINE STOP SWITCH
(3) CLUTCH SWITCH
(10) STARTER SWITCH
(8) STARTER RELAY SWITCH
(9) BATTERY
(7) DIODE
(4) STARTER MOTOR
(5) NEUTRAL SWITCH
(6) SIDE STAND SWITCH


(1) STARTER MOTOR
M
(2) STARTER RELAY SWITCH
(3) 20 A
BATTERY
G/R
R
(10) IGNITION SWITCH
R/Bl
(11) 10A
Bl/R
(12) ENGINE STOP SWITCH
(13) STARTER SWITCH
Y/R
G/R
Lg/R
(5) DIODE
(9) NEUTRAL SWITCH
(4) CLUTCH SWITCH
G/W
G/W
G/W
DOWN
UP
(6) SIDE STAND SWITCH
Bl . . . BLACK
Y . . . YELLOW
G . . . GREEN
R . . . RED
W . . . WHITE
Lg . . LIGHT GREEN

# 17. Electric Starter

| | | | |
|---|---|---|---|
| SERVICE INFORMATION | 17-1 | STARTER RELAY SWITCH | 17-9 |
| TROUBLESHOOTING | 17-2 | CLUTCH DIODE | 17-10 |
| STARTER MOTOR | 17-4 | | |

## Service Information

### GENERAL

**⚠ WARNING**

- **Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.**

- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 17-2).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing though the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- See section 10 for starter clutch servicing.
- See section 18 for following components:
  - Ignition switch
  - Engine stop switch
  - Starter switch
  - Neutral switch
  - Side stand switch
  - Clutch switch

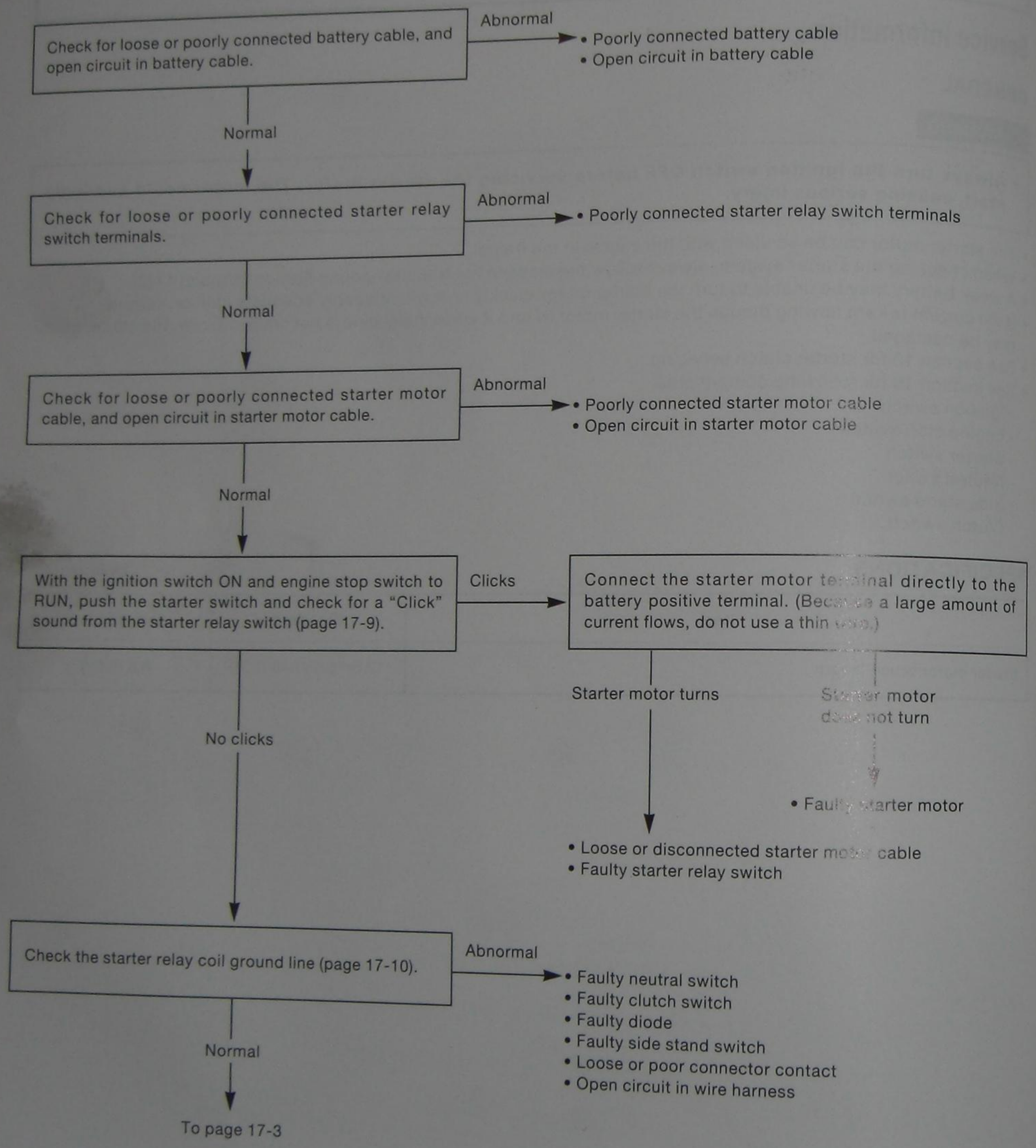
### SPECIFICATIONS

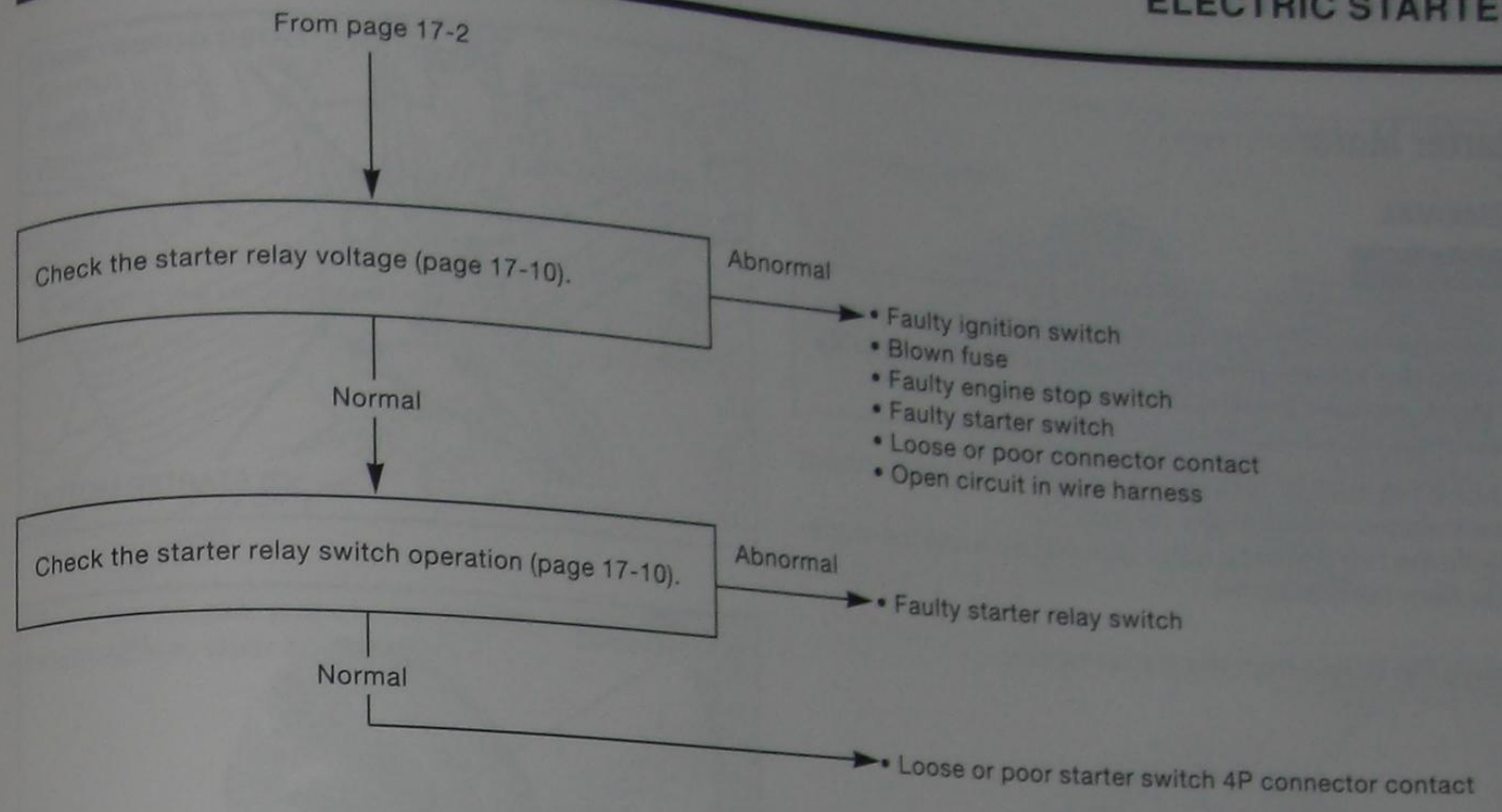
Unit: mm (in)

| Item | Standard | Service Limit |
|---|---|---|
| Starter motor brush length | 12.5-13.5 (0.49-0.51) | 8.5 (0.33) |

## Troubleshooting

**Starter motor will not turn**
- Check for a blown main fuse (20 A) or sub-fuse (10 A)
- Check that the battery is fully charged and in good condition


Check for loose or poorly connected battery cable, and open circuit in battery cable.
Abnormal
• Poorly connected battery cable
• Open circuit in battery cable
Normal
Check for loose or poorly connected starter relay switch terminals.
Abnormal
• Poorly connected starter relay switch terminals
Normal
Check for loose or poorly connected starter motor cable, and open circuit in starter motor cable.
Abnormal
• Poorly connected starter motor cable
• Open circuit in starter motor cable
Normal
With the ignition switch ON and engine stop switch to RUN, push the starter switch and check for a "Click" sound from the starter relay switch (page 17-9).
Clicks
Connect the starter motor terminal directly to the battery positive terminal. (Because a large amount of current flows, do not use a thin wire.)
Starter motor turns
Starter motor does not turn
• Faulty starter motor
• Loose or disconnected starter motor cable
• Faulty starter relay switch
No clicks
Check the starter relay coil ground line (page 17-10).
Abnormal
• Faulty neutral switch
• Faulty clutch switch
• Faulty diode
• Faulty side stand switch
• Loose or poor connector contact
• Open circuit in wire harness
Normal
To page 17-3


From page 17-2
Check the starter relay voltage (page 17-10).
Abnormal
• Faulty ignition switch
• Blown fuse
• Faulty engine stop switch
• Faulty starter switch
• Loose or poor connector contact
• Open circuit in wire harness
Normal
Check the starter relay switch operation (page 17-10).
Abnormal
• Faulty starter relay switch
Normal
• Loose or poor starter switch 4P connector contact

**Starter motor turns slowly**
- Weak battery
- Poorly connected battery cable
- Poorly connected starter motor cable
- Faulty starter motor

**Starter motor turns, but engine does not turn**
- Faulty starter clutch (section 10)

**Starter relay switch "clicks", but engine does not turn over**
- Crankshaft does not turn due engine problem
- Faulty starter clutch (section 10)
- Faulty starter reduction gear (section 10)

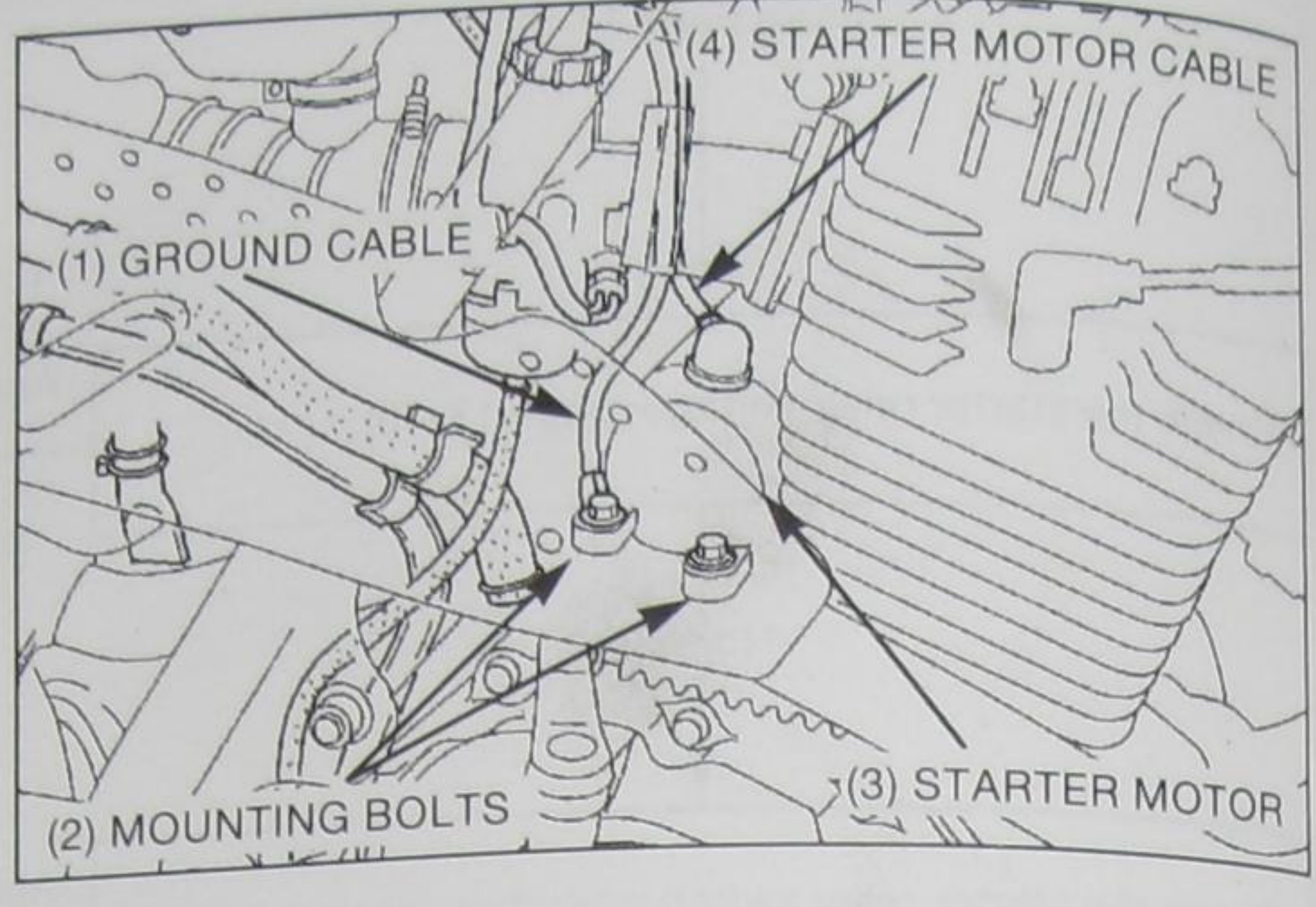
## Starter Motor

### REMOVAL

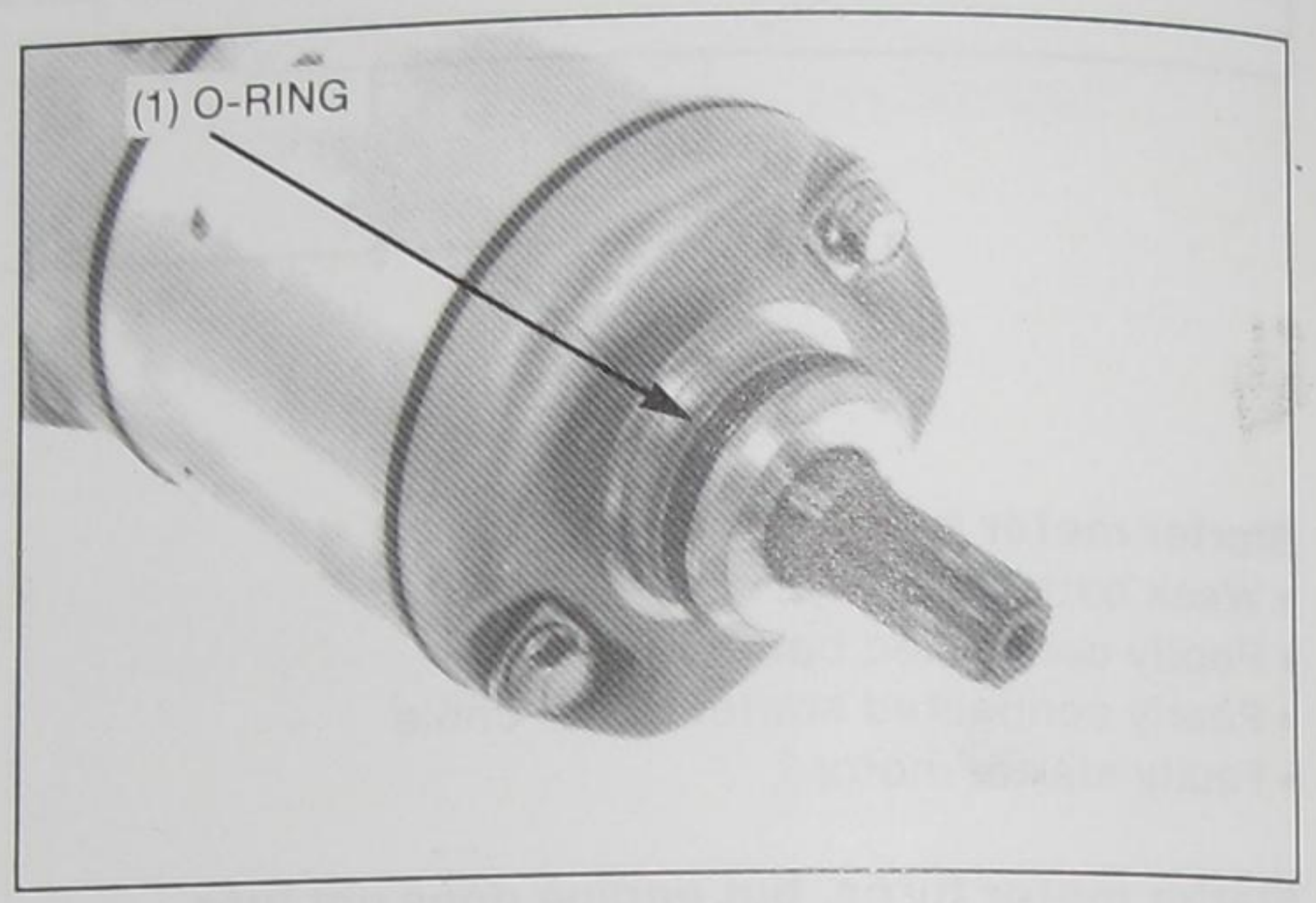
**⚠ WARNING**

- **Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.**

Remove the rubber cap, terminal nut and starter motor cable from the starter motor terminal.
Remove the two mounting bolts, ground cable and the starter motor from the crankcase.

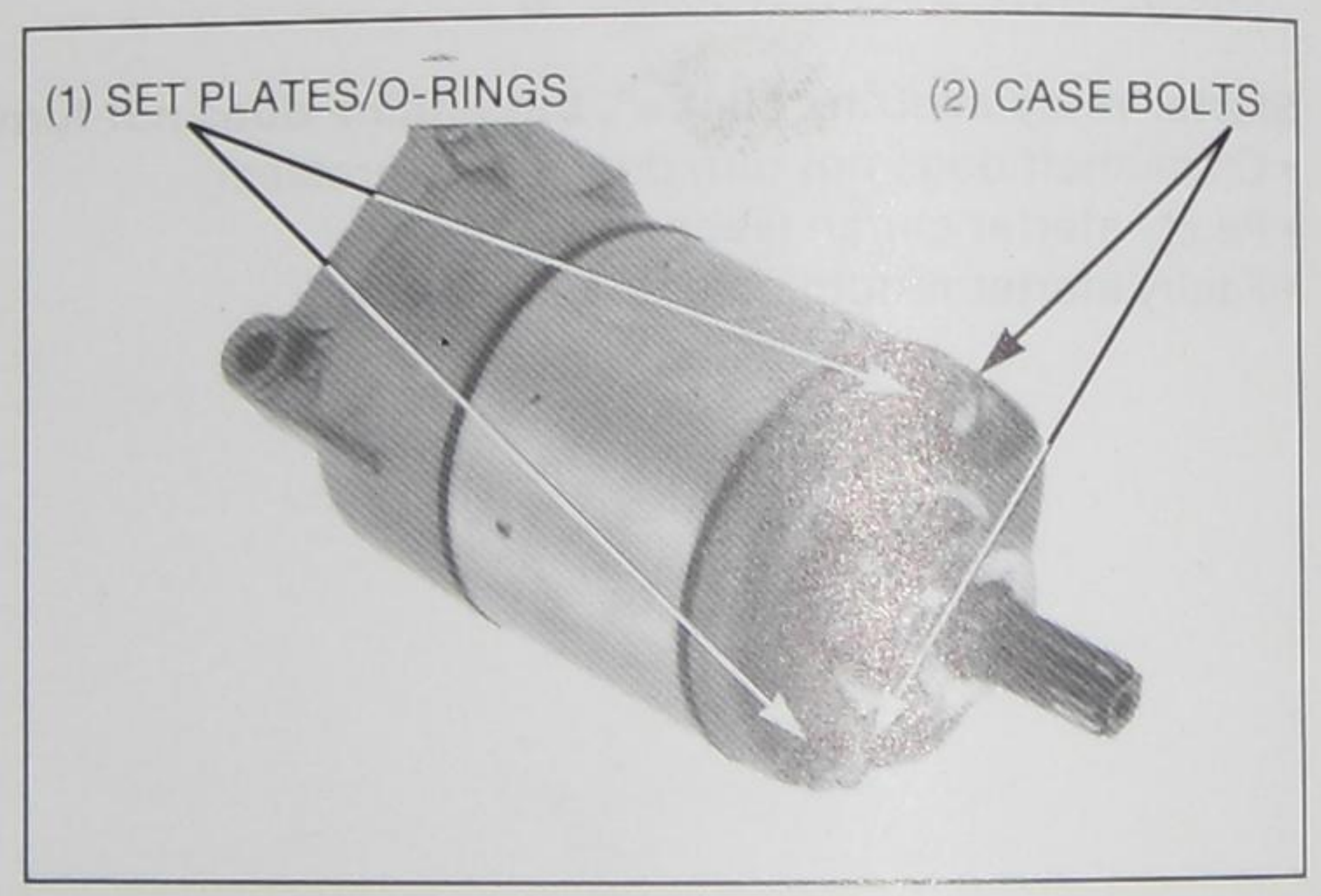

(4) STARTER MOTOR CABLE
(1) GROUND CABLE
(2) MOUNTING BOLTS
(3) STARTER MOTOR

Remove the O-ring from the starter motor.

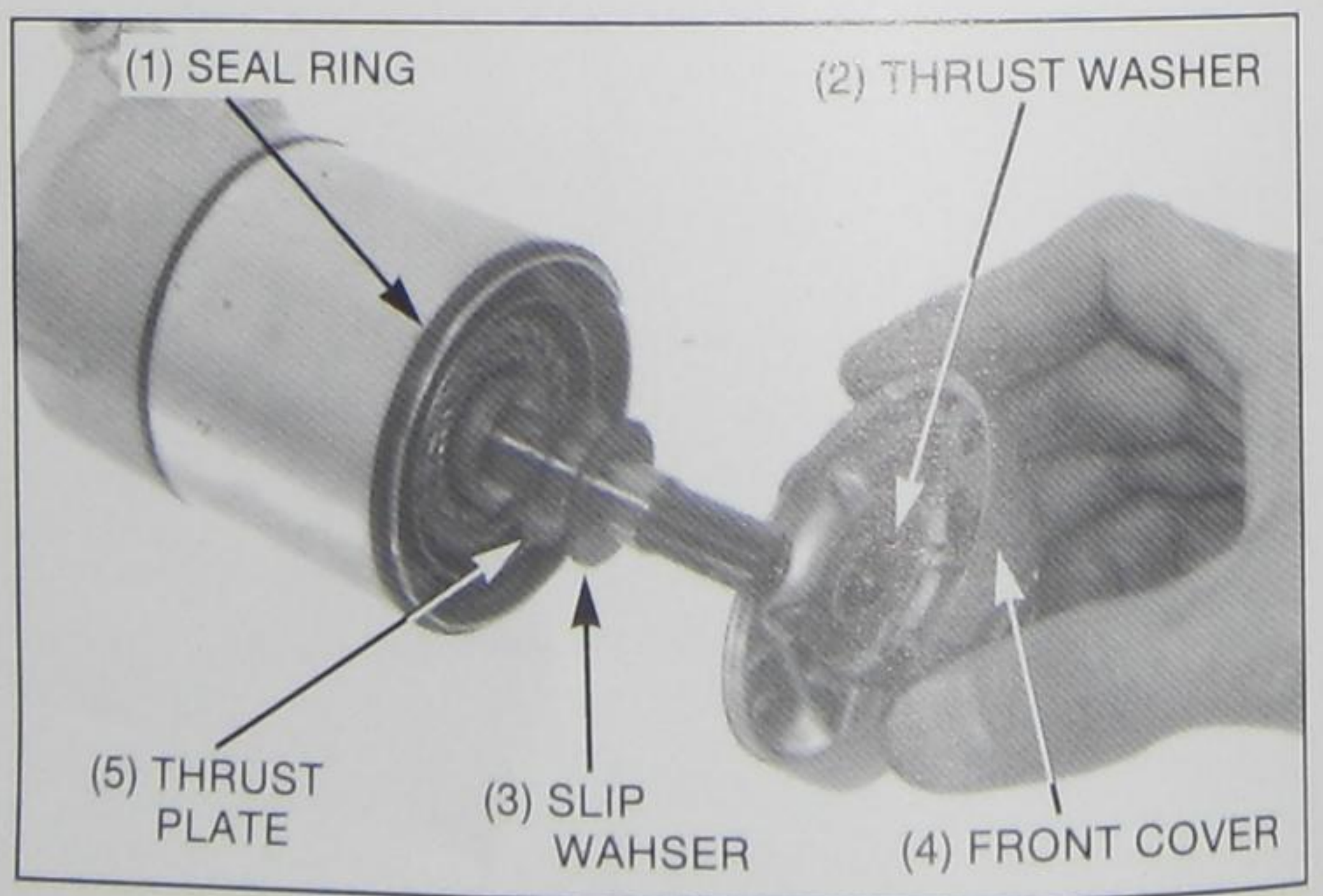


### DISASSEMBLY/INSPECTION

Remove the two starter motor case bolts, set plates and O-rings.


(1) SET PLATES/O-RINGS
(2) CASE BOLTS

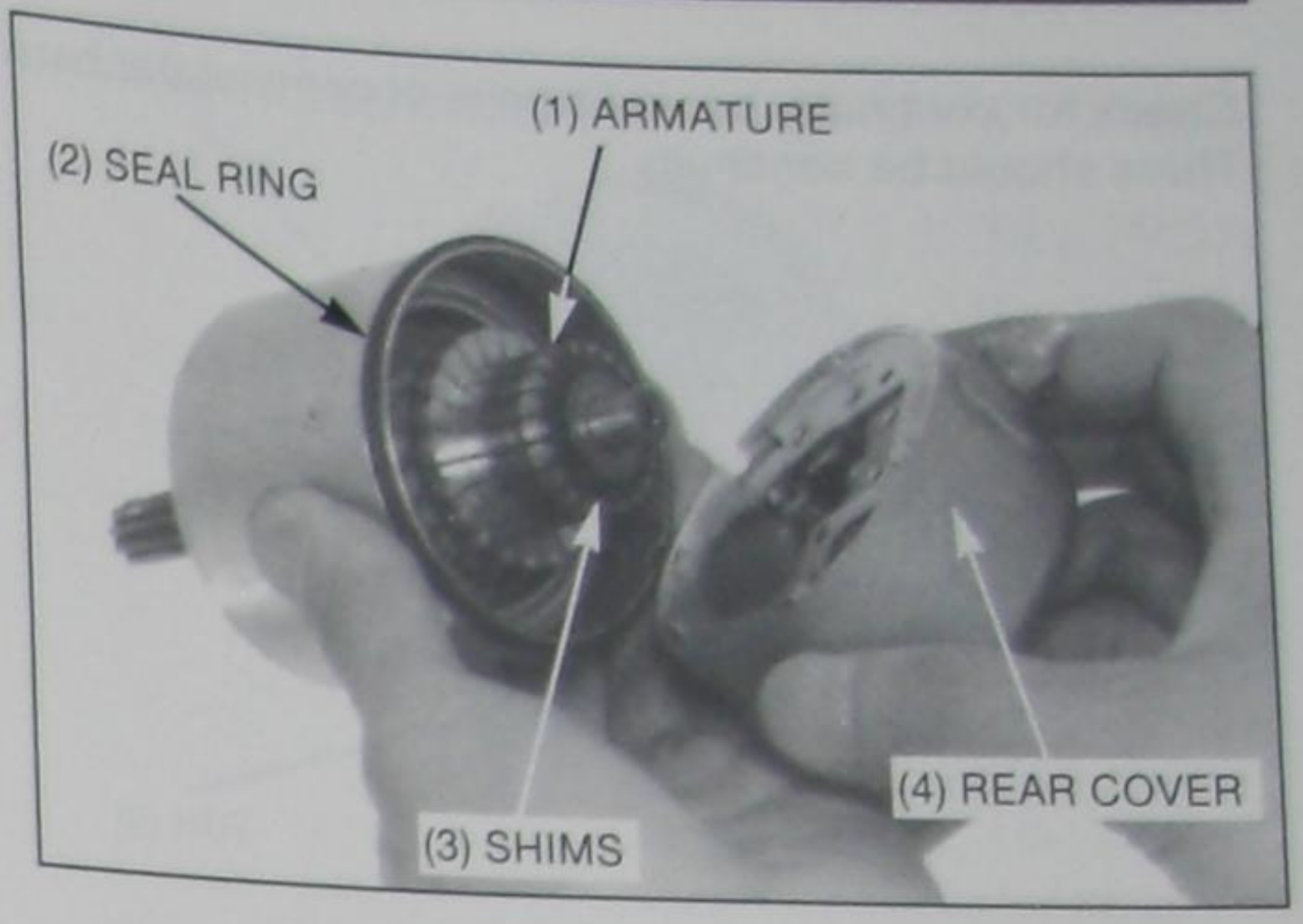
Remove the following:
- Front cover
- Thrust plate
- Slip washer
- Thrust washer
- Seal ring


(1) SEAL RING
(2) THRUST WASHER
(5) THRUST PLATE
(3) SLIP WAHSER
(4) FRONT COVER

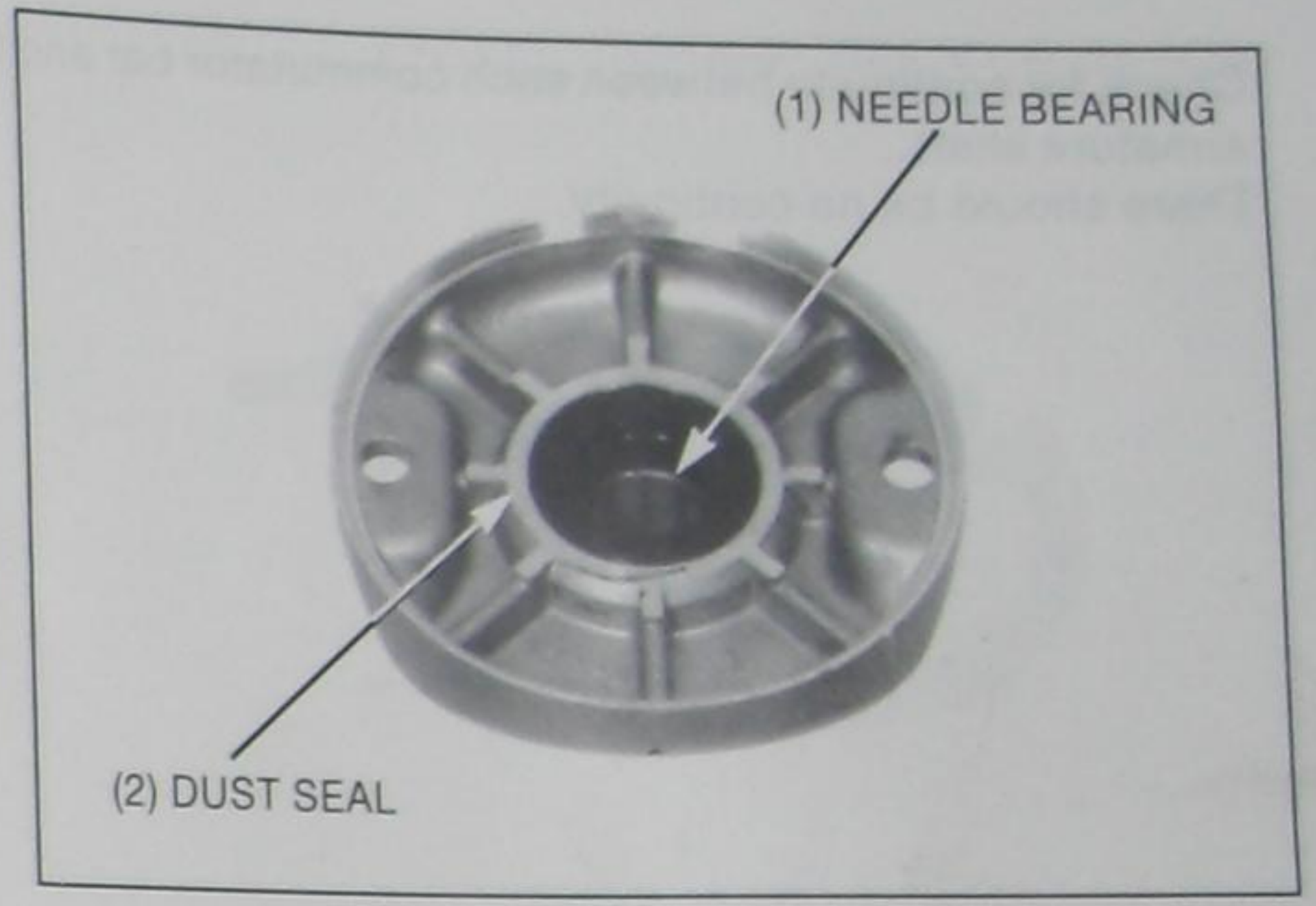
- Rear cover
- Shims
- Seal ring
- Armature

NOTE:

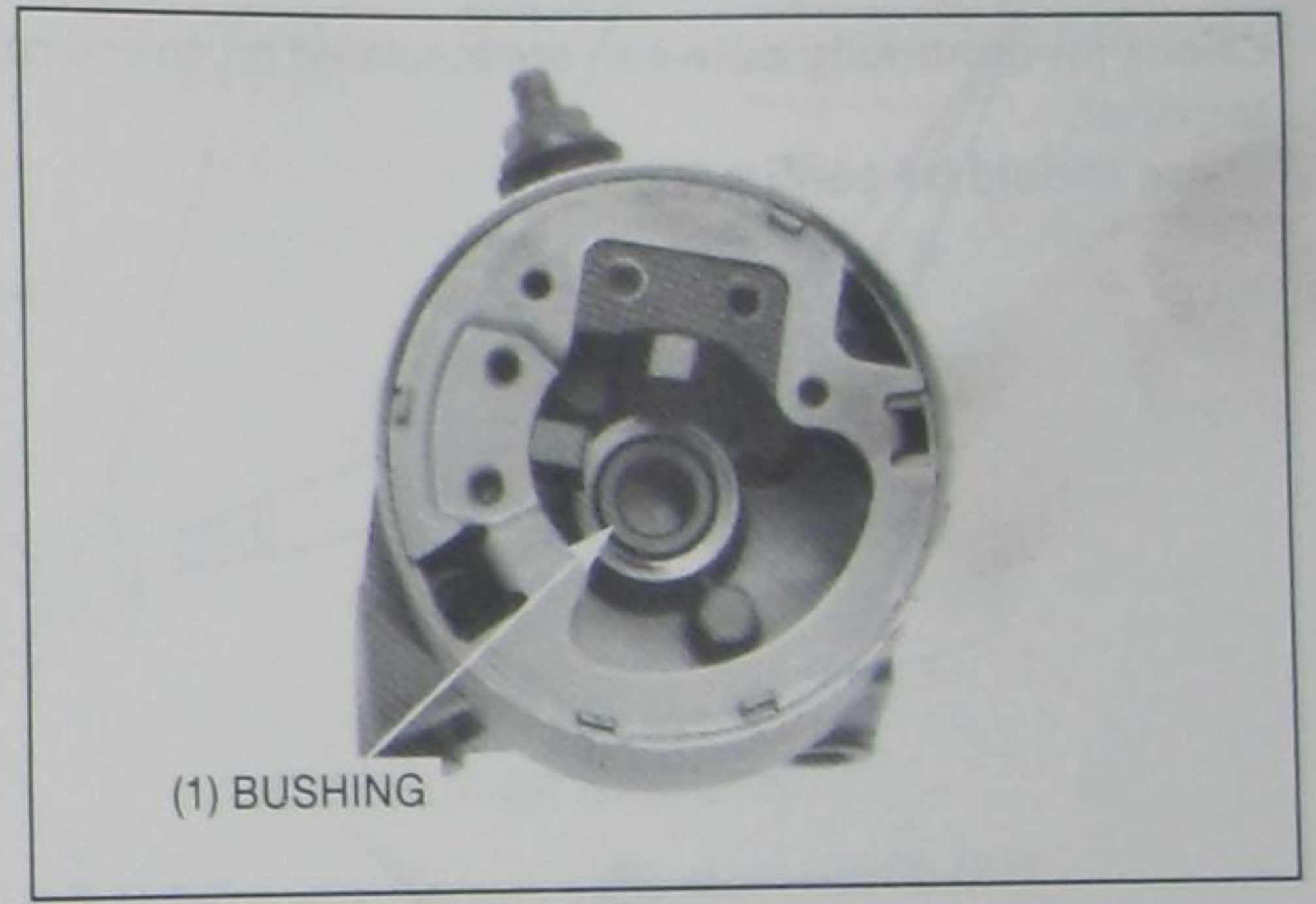
- Record the location and number of the shims.


(2) SEAL RING
(1) ARMATURE
(3) SHIMS
(4) REAR COVER

Check the oil seal and needle bearing in the front cover for deterioration, wear or damage.


(1) NEEDLE BEARING
(2) DUST SEAL

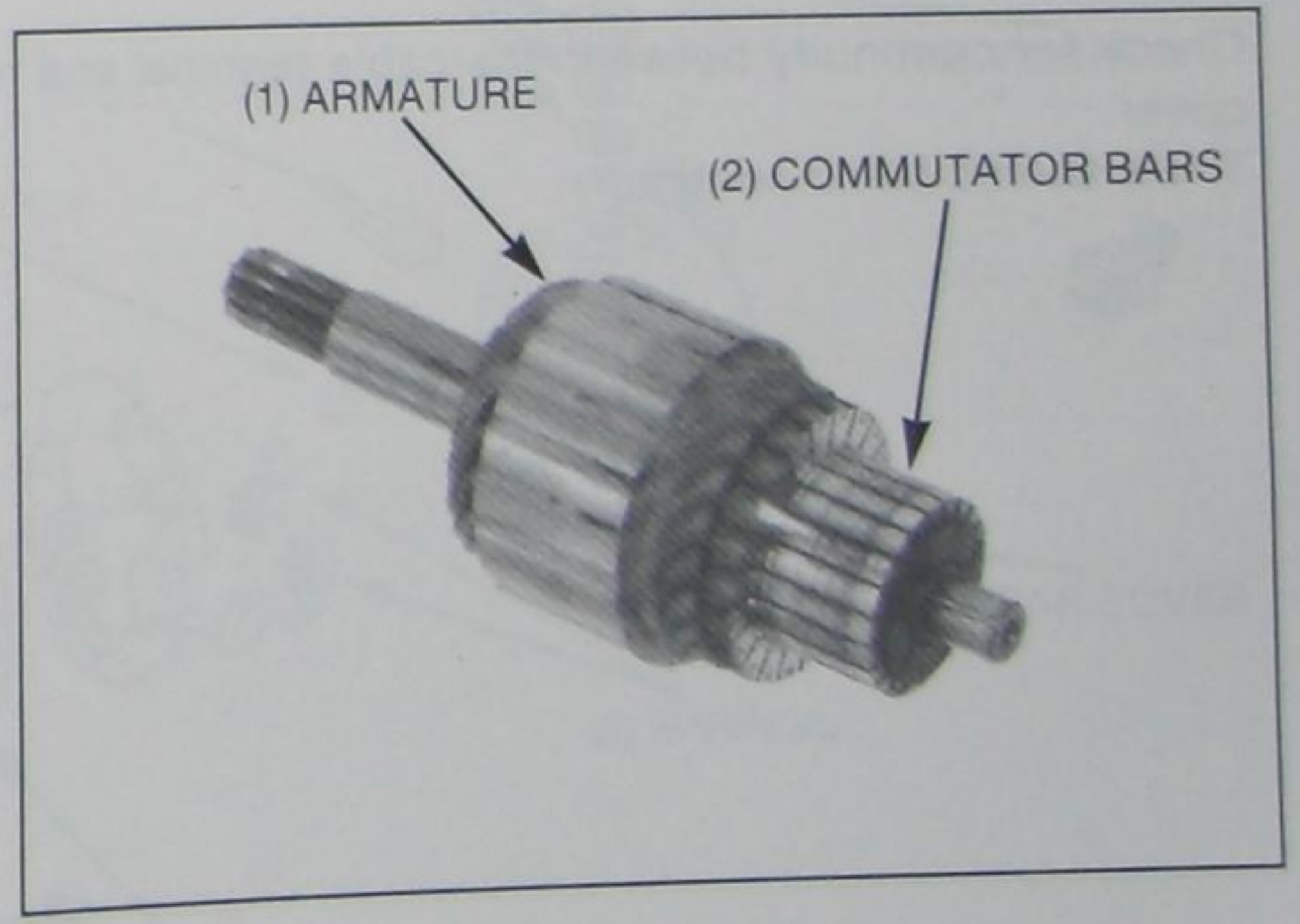
Check the bushing in the rear cover for wear or damage.



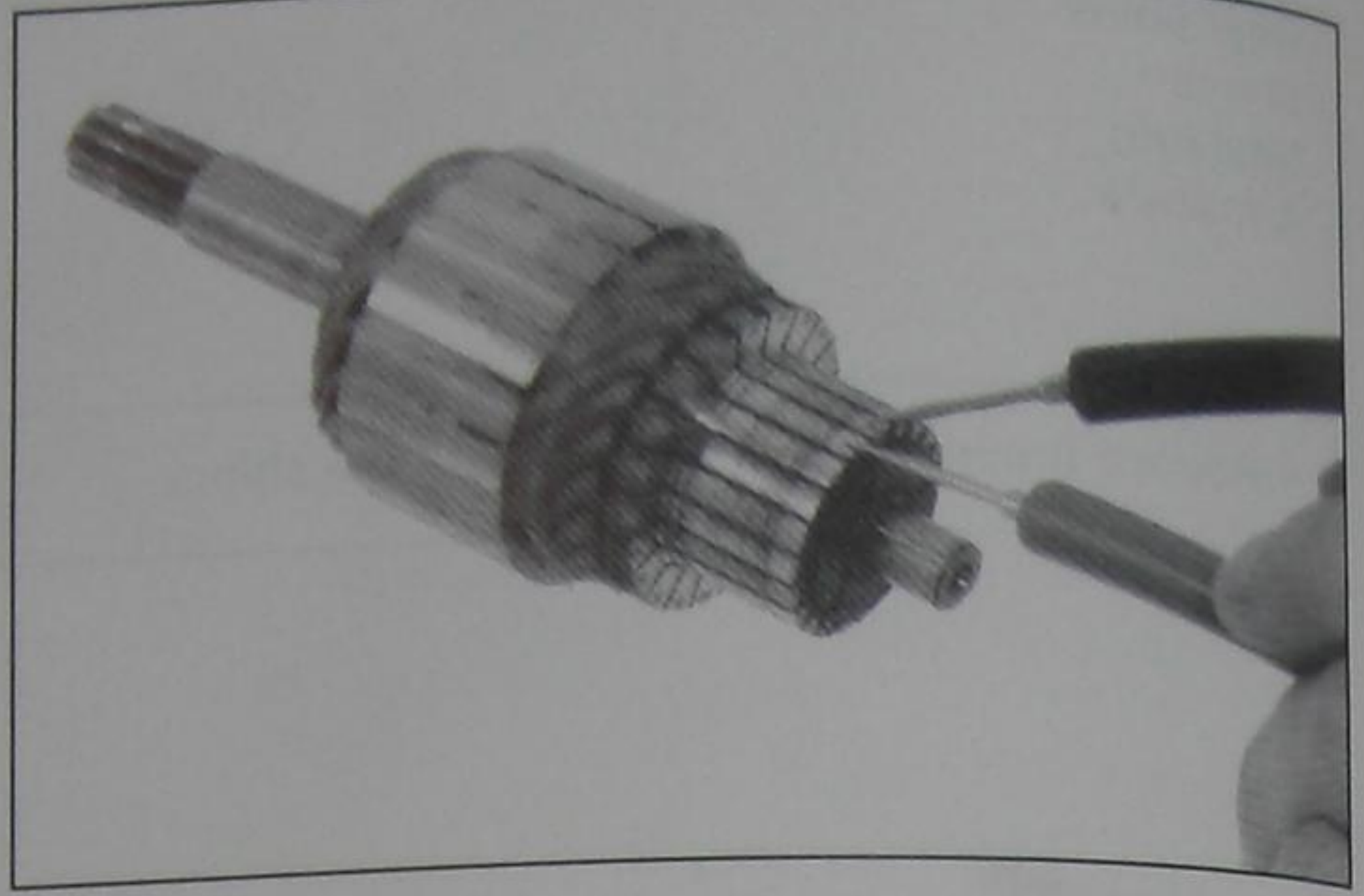
Check the commutator bars of the armature for discoloration.

NOTE:

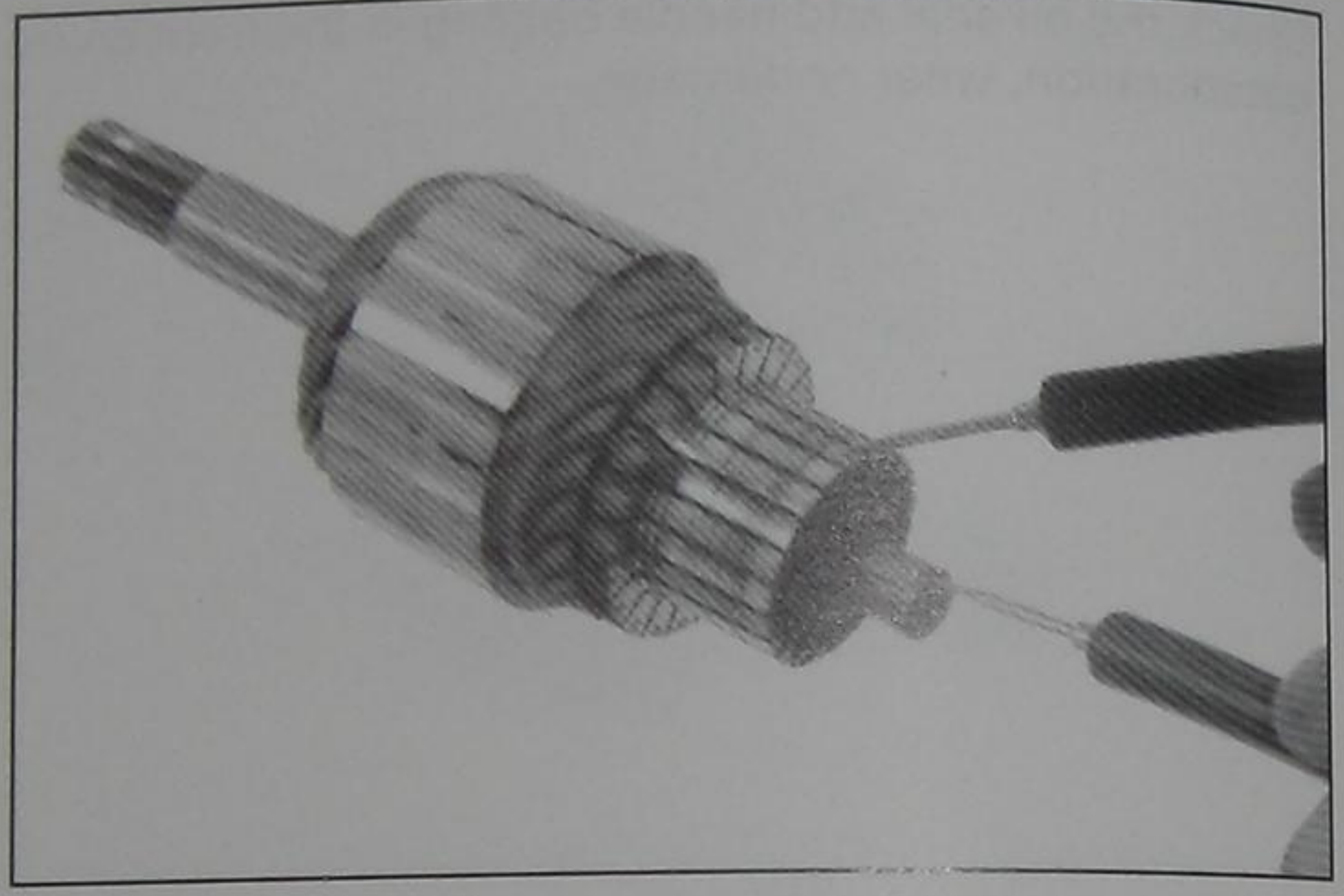
- Do not use emery or sand paper on the commutator.


(1) ARMATURE
(2) COMMUTATOR BARS

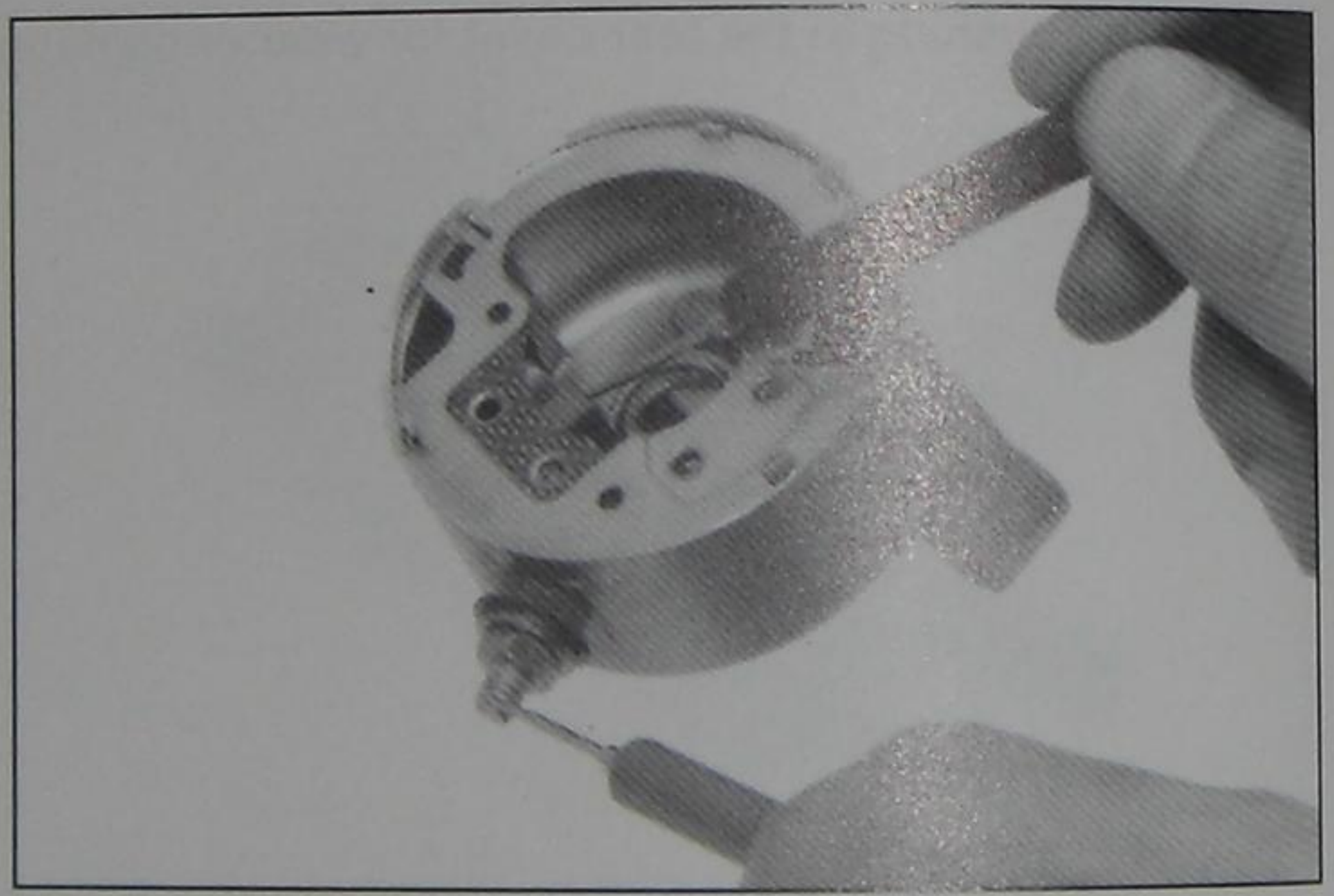
Check for continuity between pairs of commutator bars.
There should be continuity.



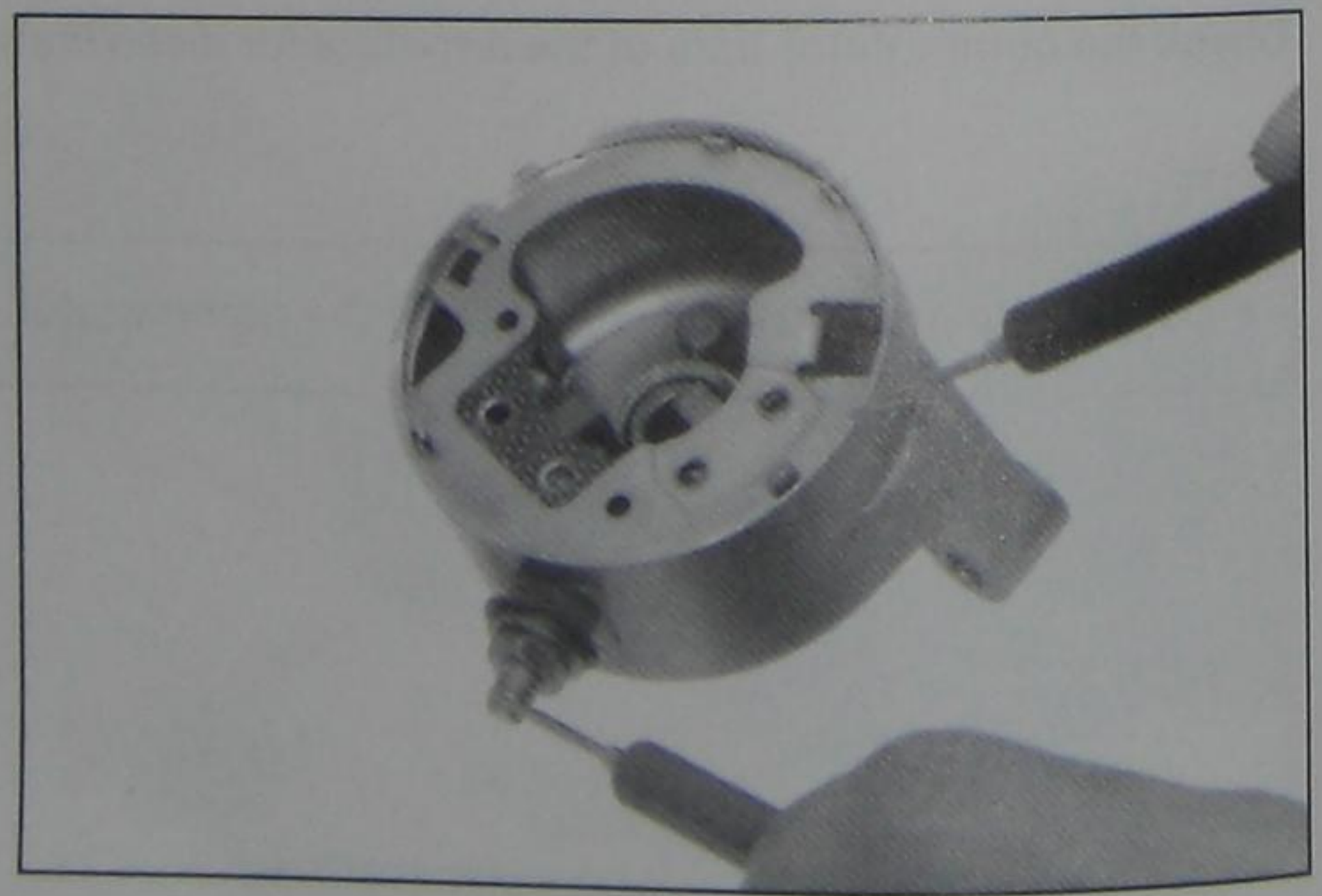
Check for continuity between each commutator bar and the armature shaft.
There should be no continuity.



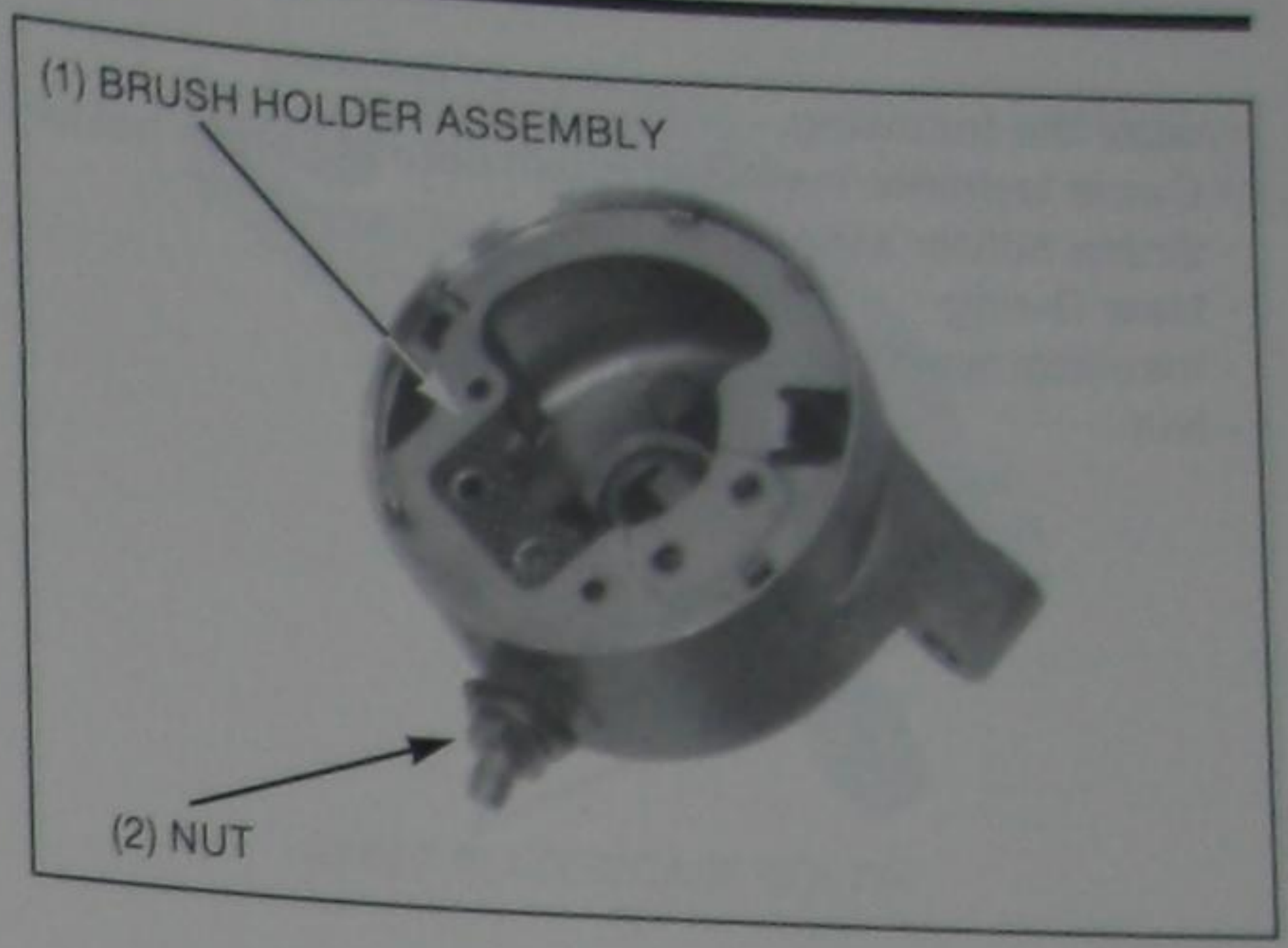
Check for continuity between the insulated brush and cable terminal.
There should be continuity.



Check for continuity between the cable terminal and rear cover.
There should be no continuity.



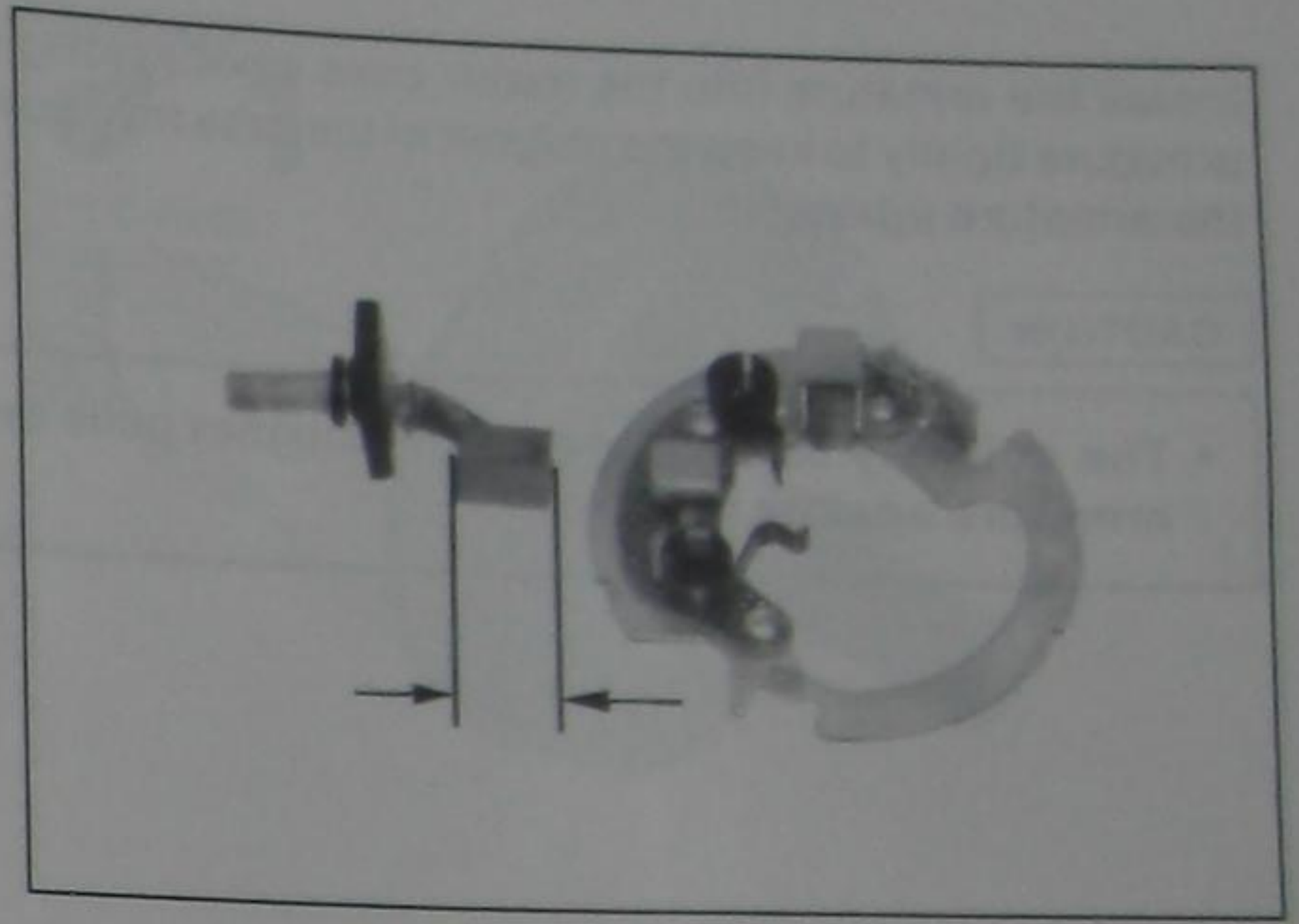
Remove the following:
- Nut
- Washer
- Insulator washers
- O-ring
- Brush holder assembly


(1) BRUSH HOLDER ASSEMBLY
(2) NUT

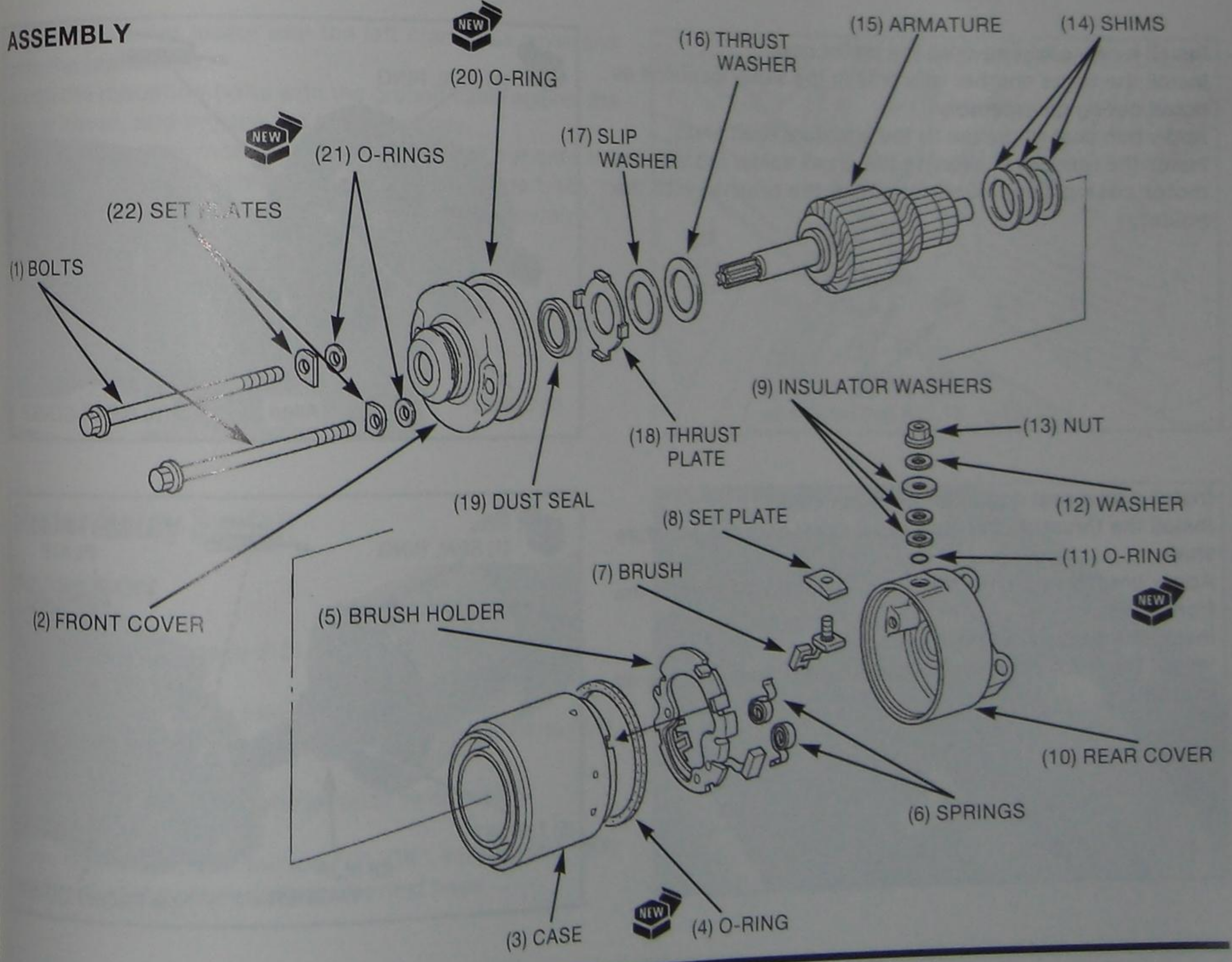
Remove the cable terminal/insulated brush from the brush holder.

Measure the brush length.

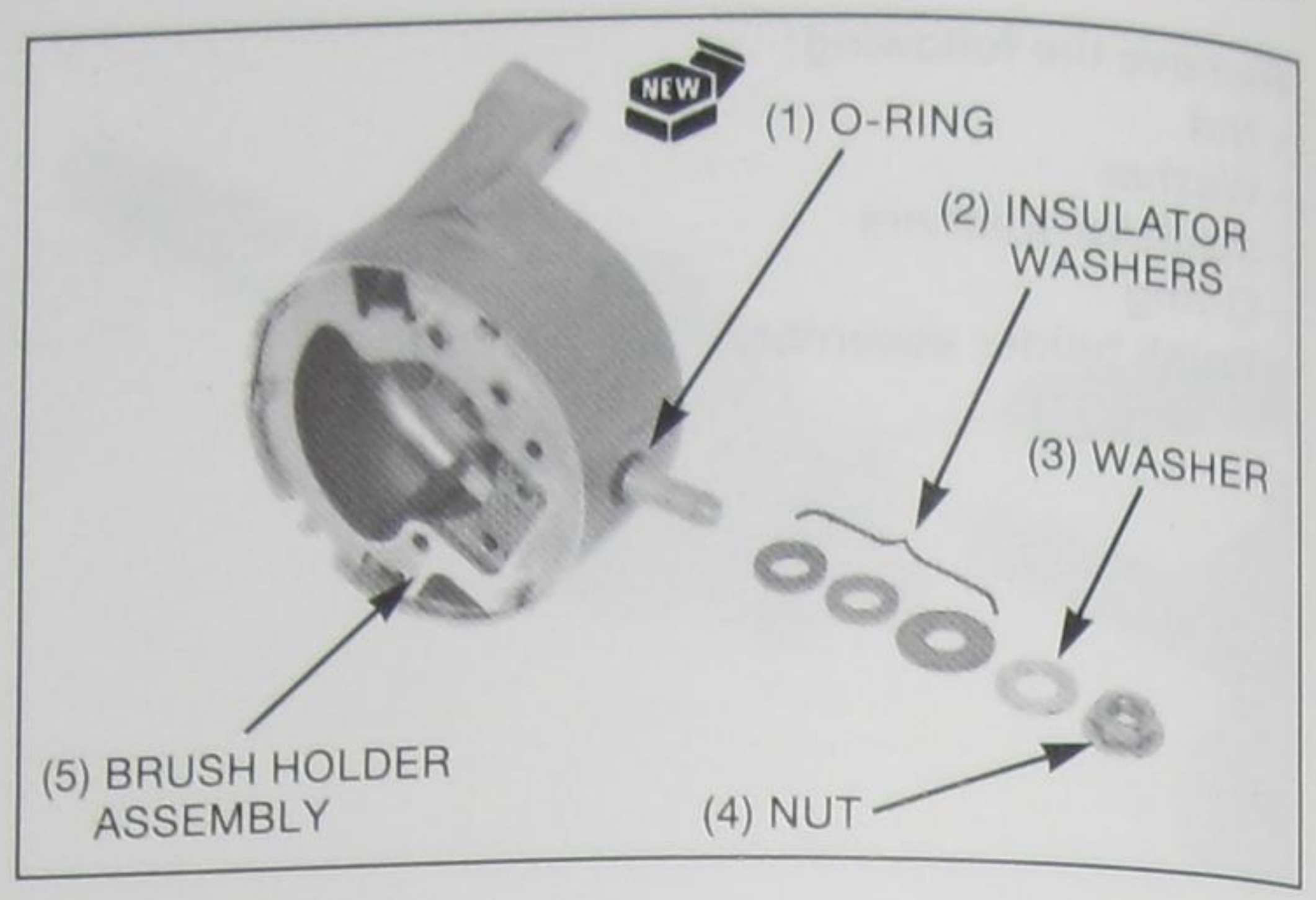
**SERVICE LIMIT: 8.5 mm (0.33 in)**



## ASSEMBLY


NEW
(20) O-RING
(16) THRUST WASHER
(15) ARMATURE
(14) SHIMS
NEW
(21) O-RINGS
(17) SLIP WASHER
(22) SET PLATES
(1) BOLTS
(9) INSULATOR WASHERS
(18) THRUST PLATE
(13) NUT
(12) WASHER
(19) DUST SEAL
(8) SET PLATE
(11) O-RING
(7) BRUSH
(2) FRONT COVER
(5) BRUSH HOLDER
NEW
(10) REAR COVER
(6) SPRINGS
(3) CASE
NEW
(4) O-RING

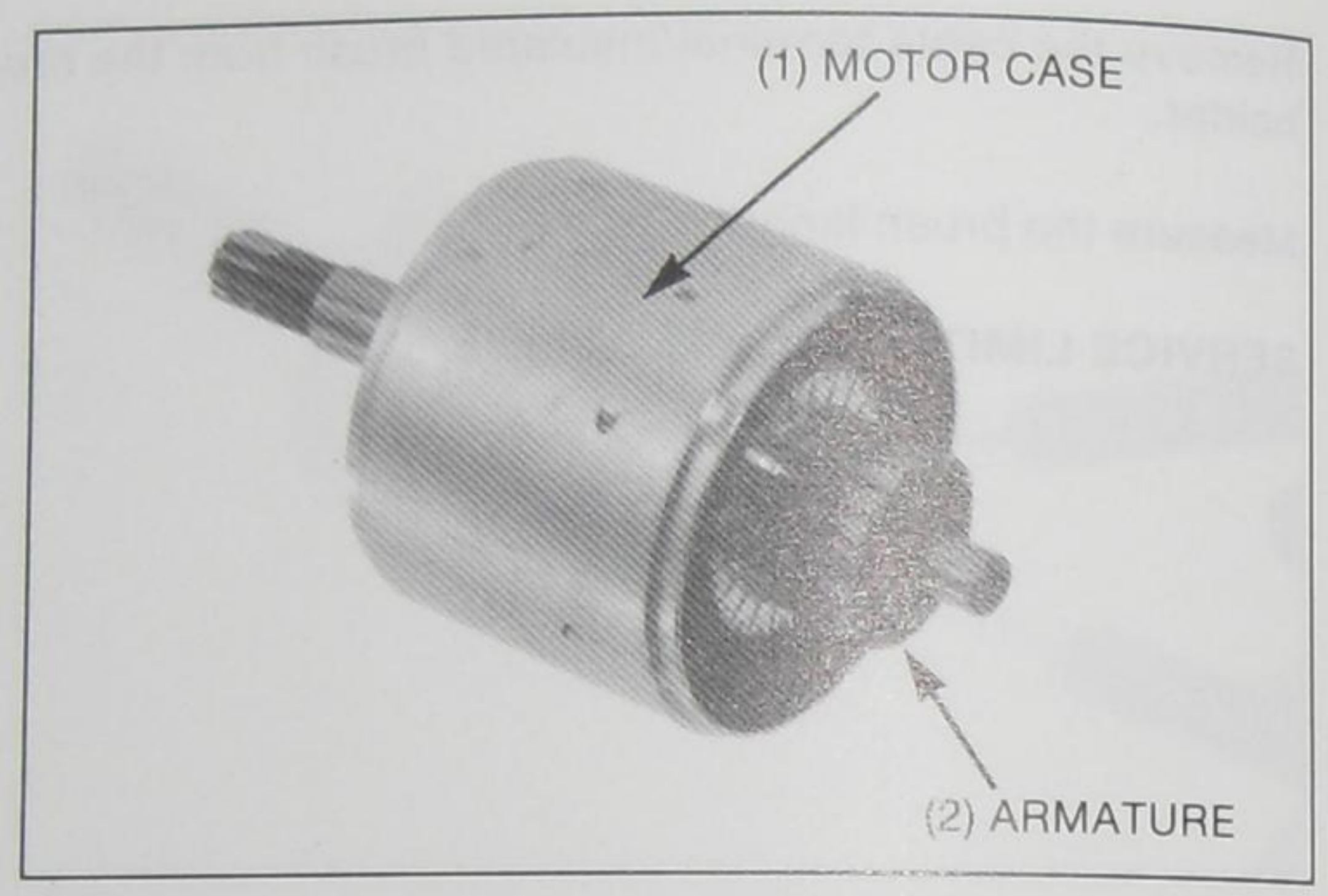
Install the following:
- Cable terminal/insulated brush onto the brush holder
- Brush holder assembly
- New O-ring
- Insulator washers
- Nut


NEW
(1) O-RING
(2) INSULATOR WASHERS
(3) WASHER
(5) BRUSH HOLDER ASSEMBLY
(4) NUT

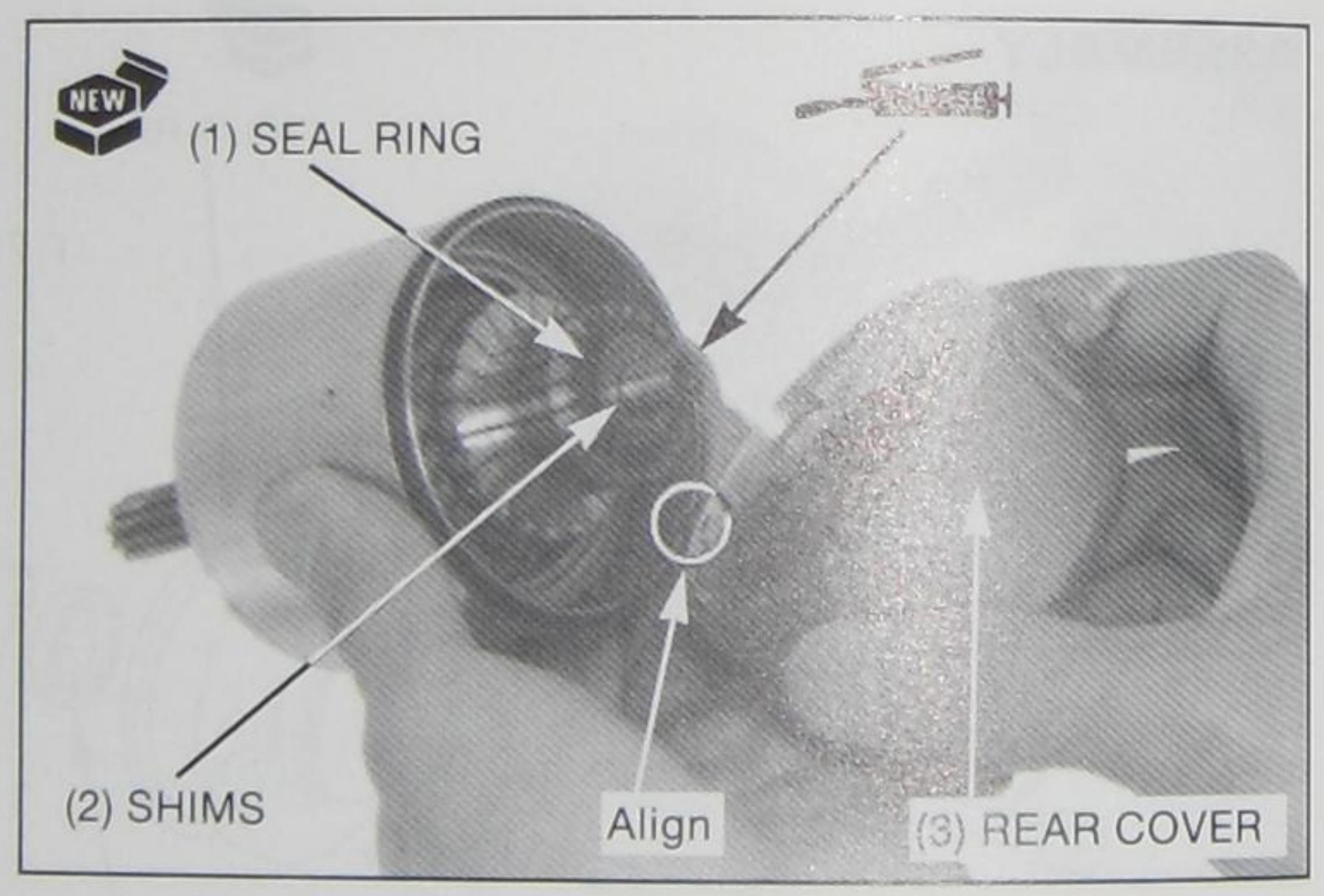
Install the armature into the motor case while holding the armature tightly to keep the magnet of the case from pulling the armature against it.

**CAUTION**

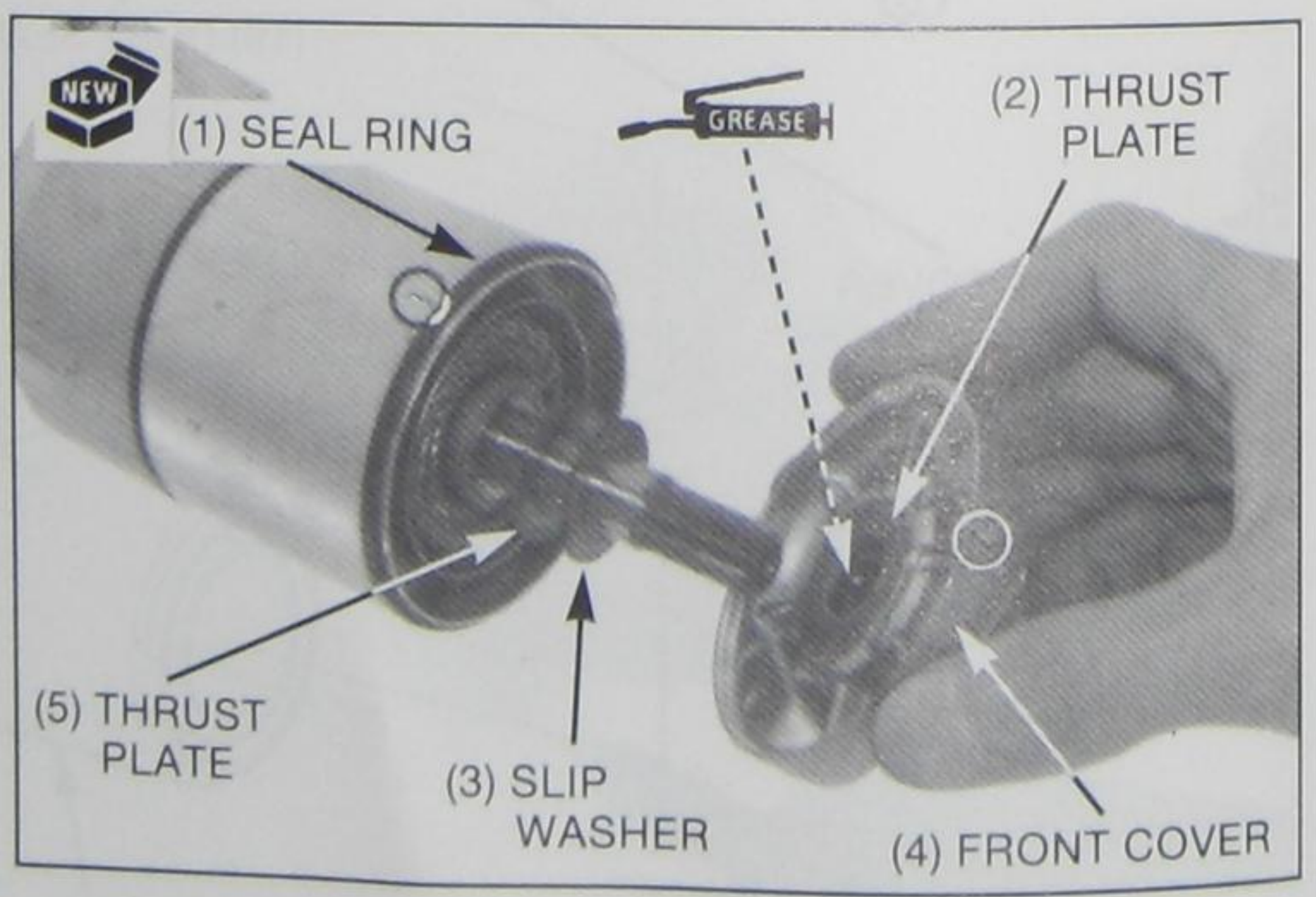
- **The coil may be damaged if the magnet pulls the armature against the case.**


(1) MOTOR CASE
(2) ARMATURE

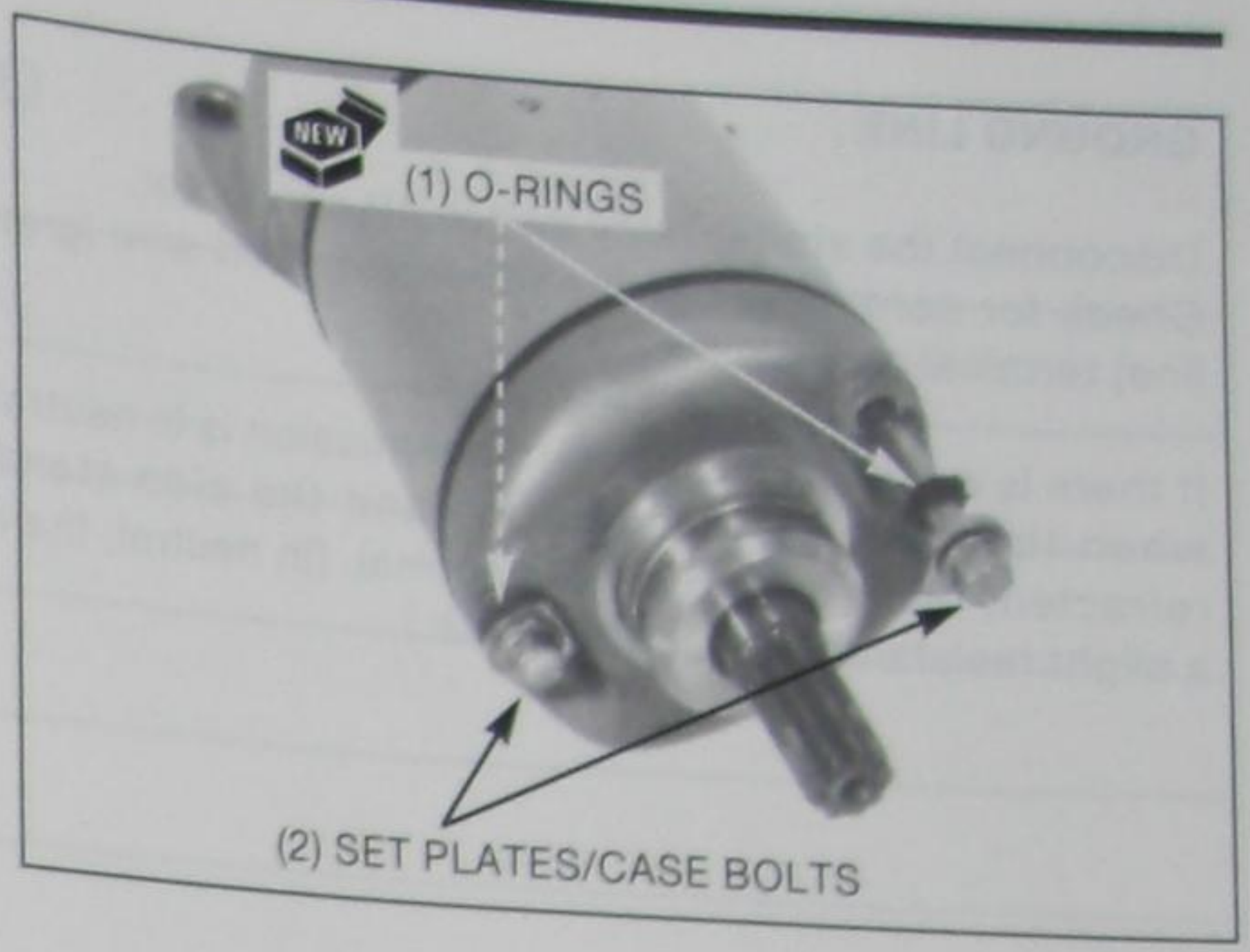
Install a new seal ring onto the motor case.
Install the same number of shims in the same locations as noted during disassembly.
Apply thin coat of grease to the armature shaft end.
Install the rear cover aligning the brush holder tab with the motor case groove, while pushing the brushes into the holder.


NEW
(1) SEAL RING
GREASE
(2) SHIMS
Align
(3) REAR COVER

Install a new seal ring onto the motor case.
Install the thrust washer and slip washer onto the armature shaft.
Apply grease to the oil seal lip and needle bearing in the front cover.
Install the thrust onto the front cover.
Install the front cover being careful not to damage the oil seal lip.

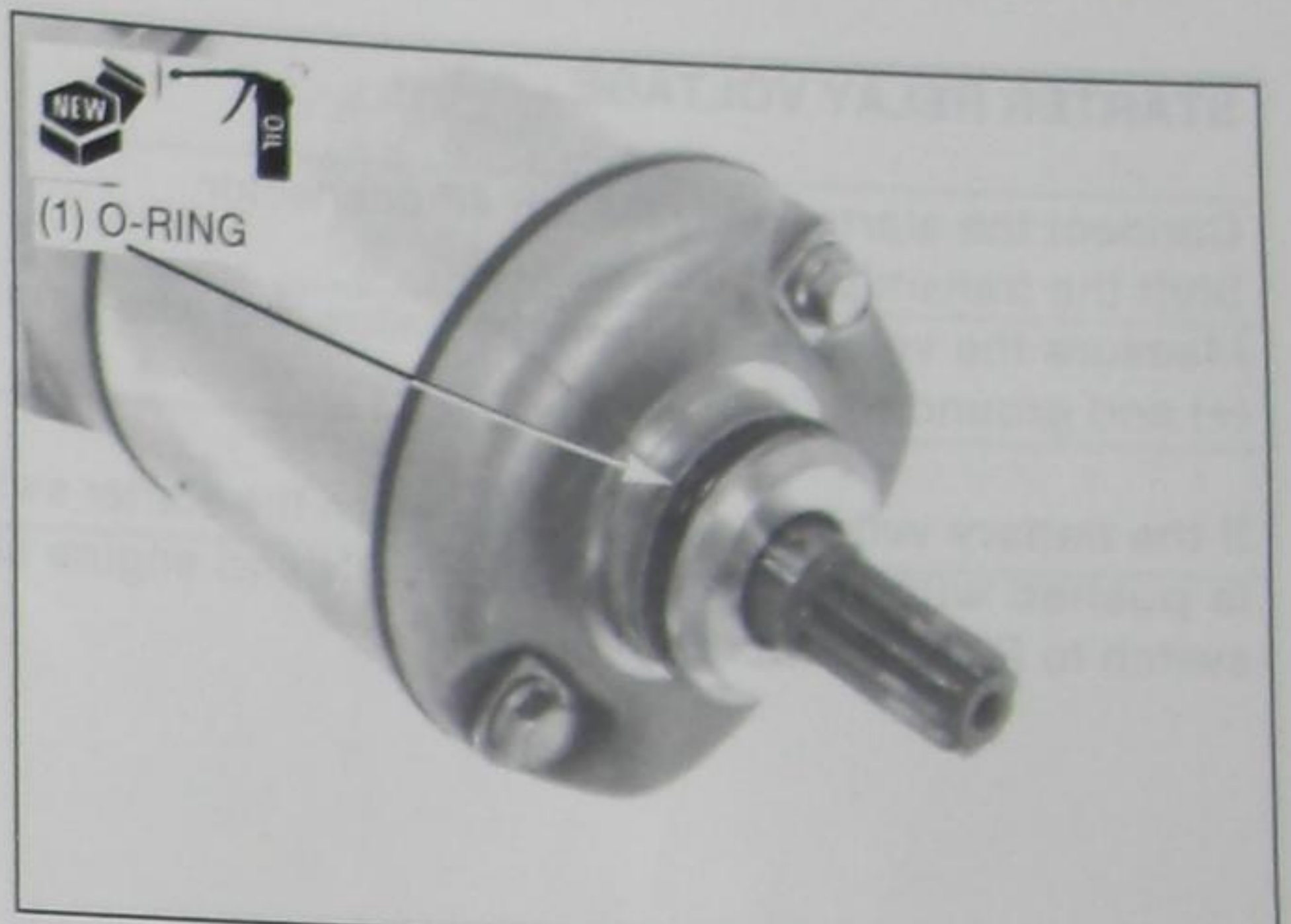

NEW
(1) SEAL RING
GREASE
(2) THRUST PLATE
(5) THRUST PLATE
(3) SLIP WASHER
(4) FRONT COVER

Install the set plates and new O-rings onto the motor case bolts.
Install and tighten the motor case bolts.

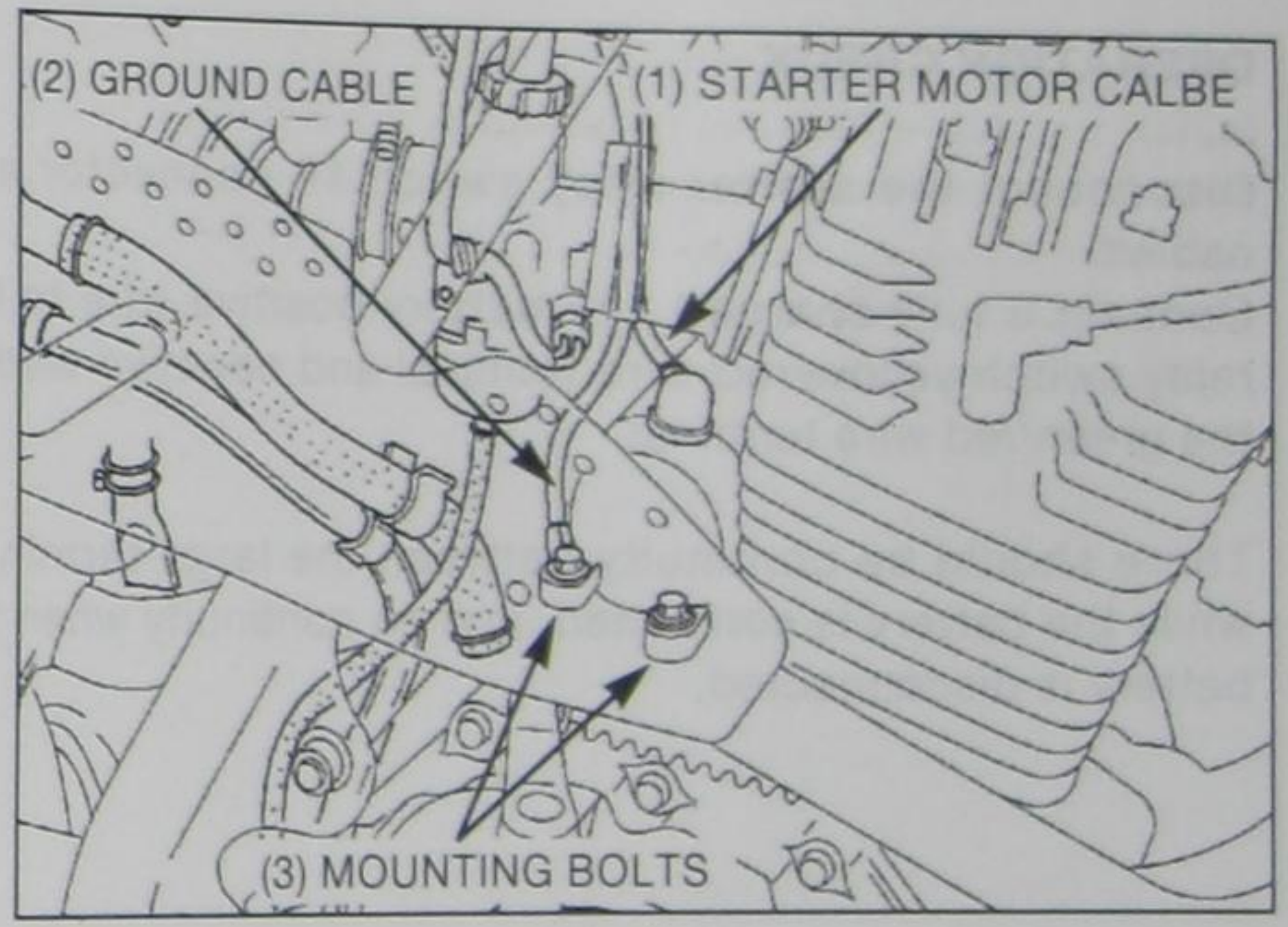

NEW
(1) O-RINGS
(2) SET PLATES/CASE BOLTS

## INSTALLATION

Coat a new O-ring with oil and install it into the startes motor groove.


NEW
OIL
(1) O-RING

Install the starter motor into the left crankcase cover and onto the crankcase.
Install the mounting bolts with the ground cable against the motor cover, and tighten the bolts securely.
Install the starter motor cable and terminal nut onto the motor terminal and tighten the nut securely (page 1-18).
Install the rubber cap over the motor terminal securely.


(2) GROUND CABLE
(1) STARTER MOTOR CALBE
(3) MOUNTING BOLTS

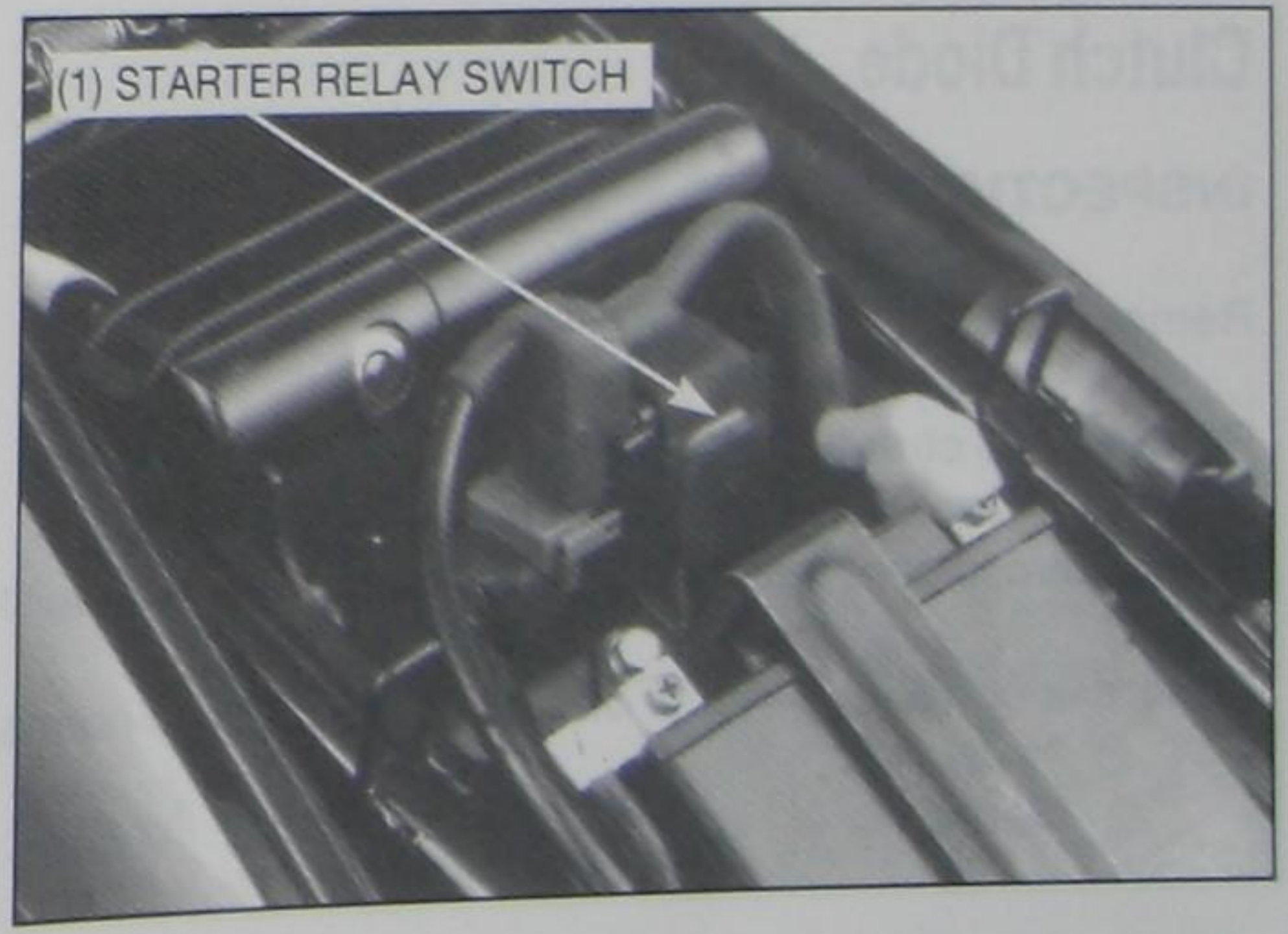
## Starter Relay Switch

### INSPECTION

Remove the seat (page 2-2).

Shift the transmission into neutral.
Turn the ignition switch ON and engine stop switch to RUN.
Push the starter switch.
The coil is normal if the starter relay switch clicks.

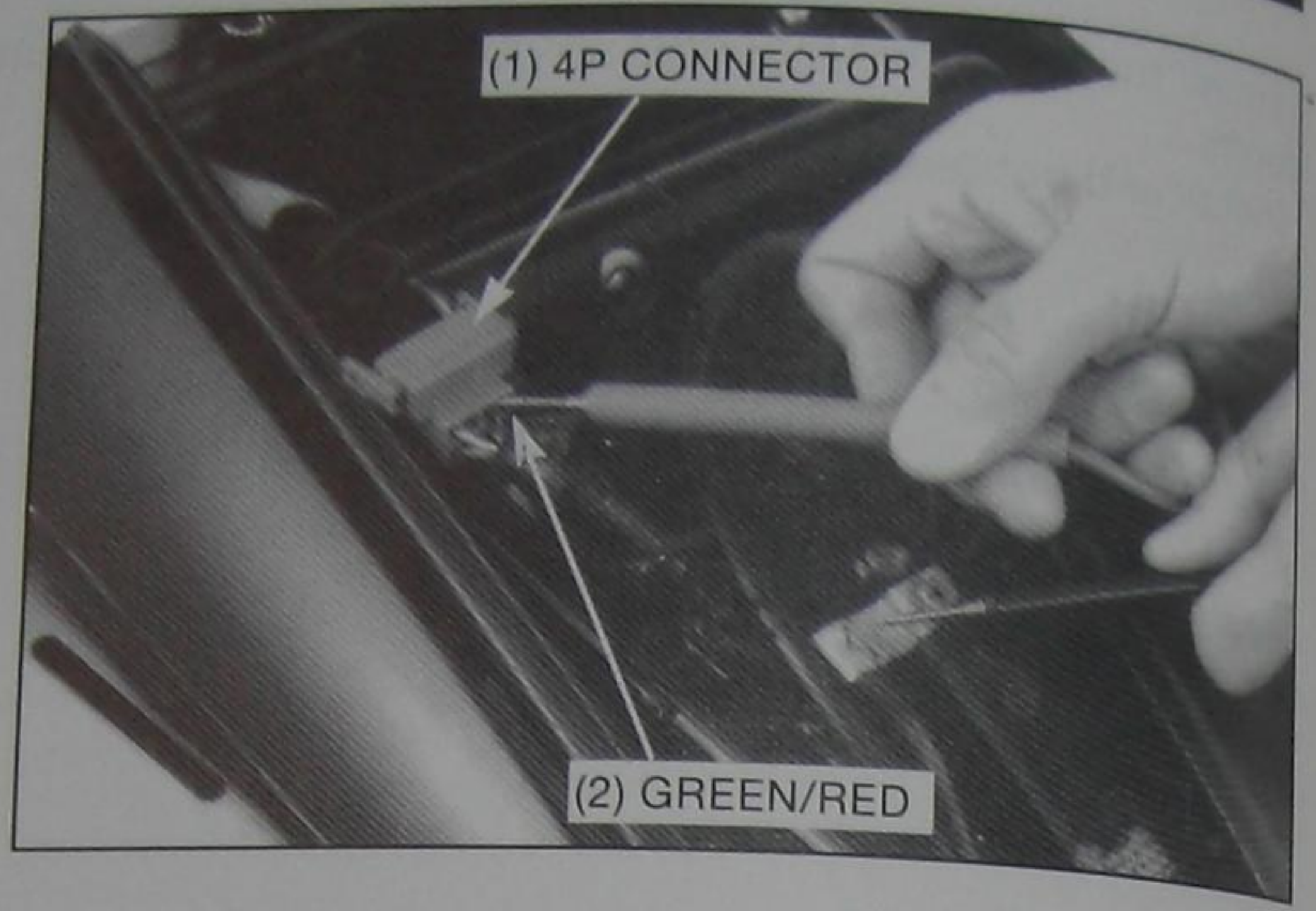
If you don't hear the switch "CLICK", inspect the relay switch using the procedure on the next page.


(1) STARTER RELAY SWITCH

### GROUND LINE

Disconnect the starter relay switch 4P connector.
Check for continuity between the green/red wire (ground line) terminal and ground.

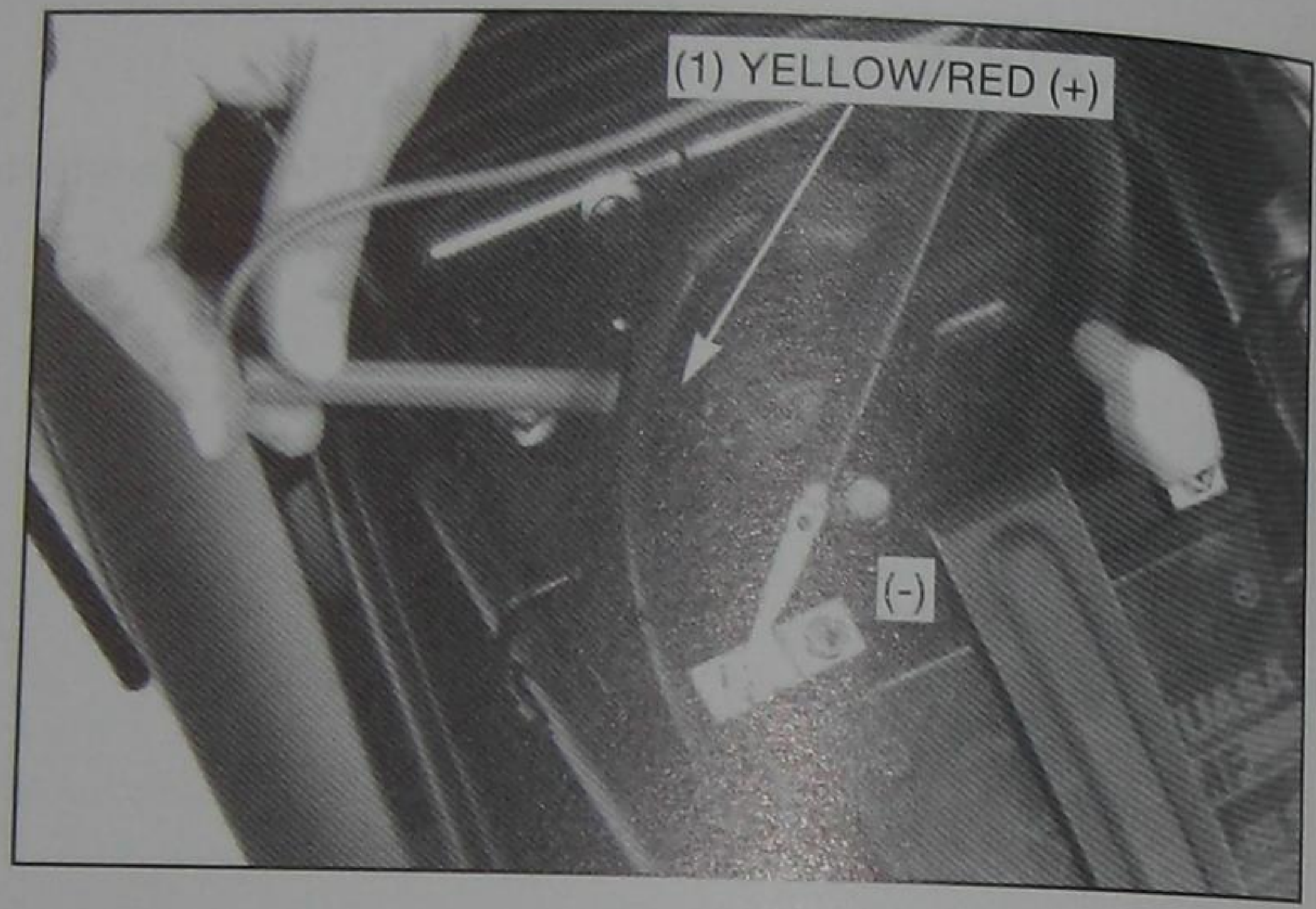
If there is continuity when the transmission is in neutral or when the clutch is disengaged and the side stand is retracted, the ground circuit is normal. (In neutral, there is a slight resistance due to the diode.)



### STARTER RELAY VOLTAGE

Connect the starter relay switch 4P connector.
Shift the transmission into neutral.
Measure the voltage between the yellow/red wire terminal (+) and ground (-).

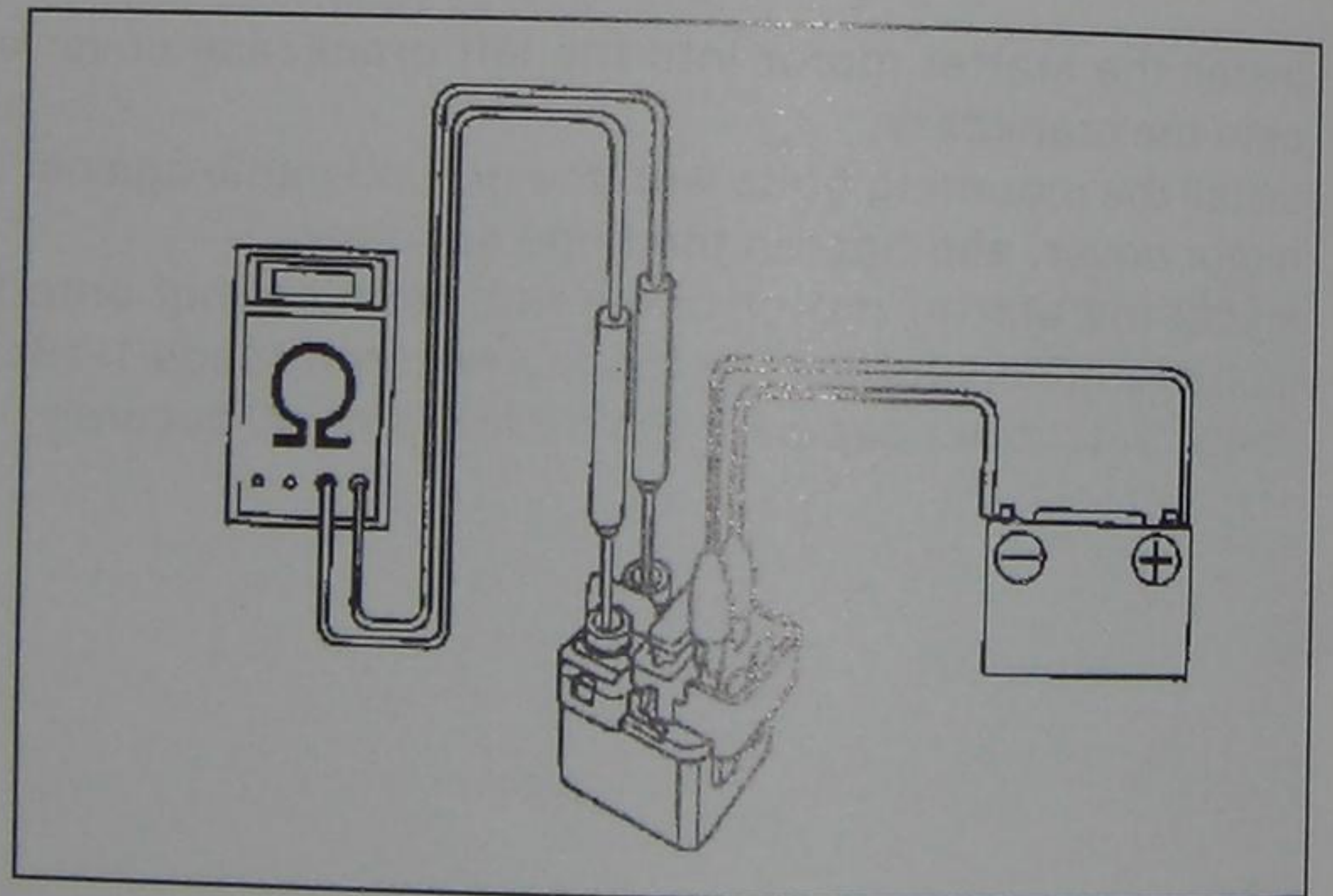
If the battery voltage appears only when the starter switch is pushed with the ignition switch ON and engine stop switch to RUN, it is normal.



### OPERATION CHECK

Disconnect the starter relay switch 4P connector and cables.
Connect a fully charged 12V battery positive wire to the relay switch yellow/red wire terminal and negative wire to the green/red wire terminal.

There should be continuity between the large terminals while the battery is connected, and no continuity when the battery is disconnected.



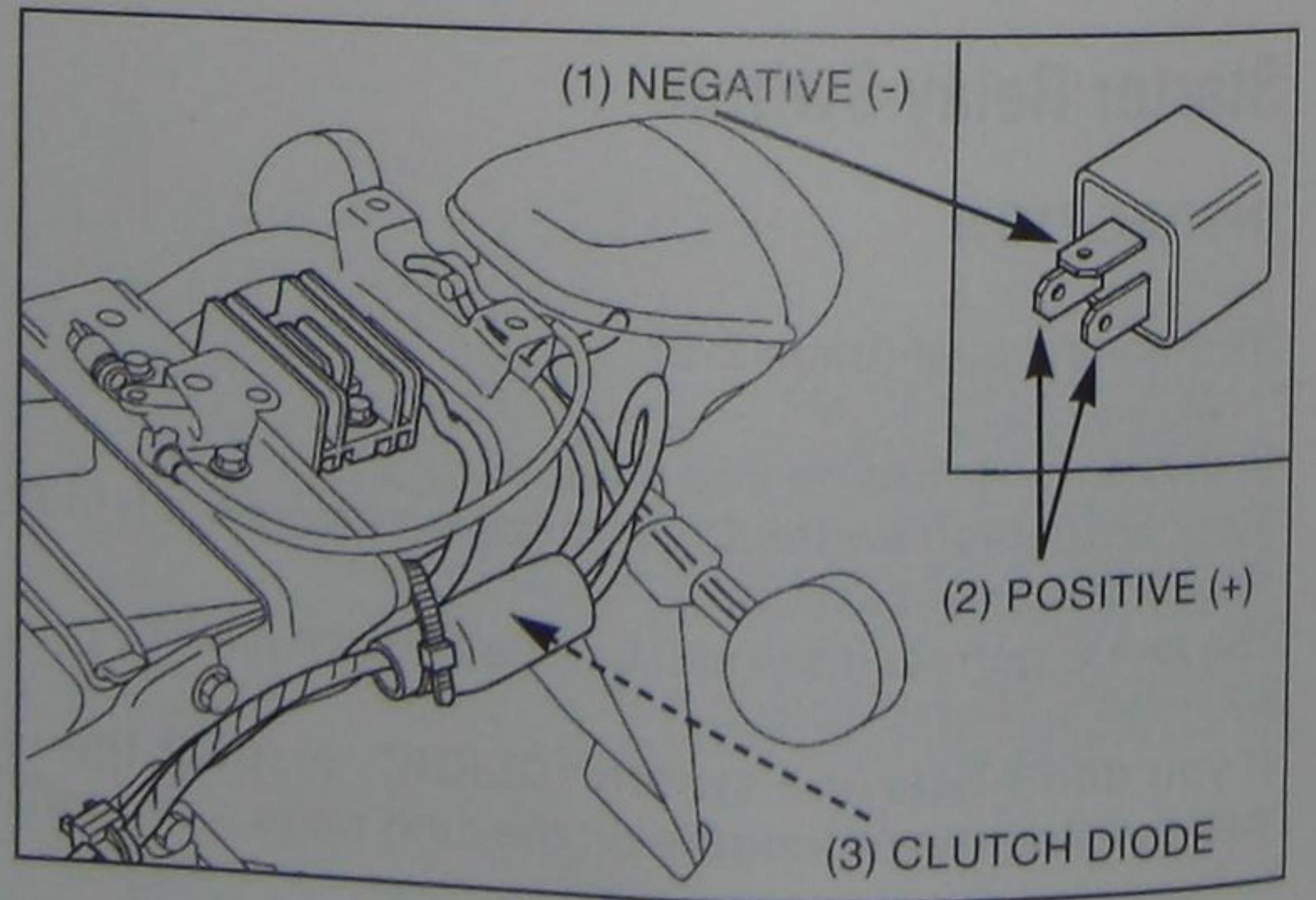
## Clutch Diode

### INSPECTION

Remove the seat cowl (page 2-3).

Remove the clutch diode.
Check for continuity between the diode terminals.
When there is continuity, a small resistance value will register.

If there is continuity in one direction, the diode is normal.



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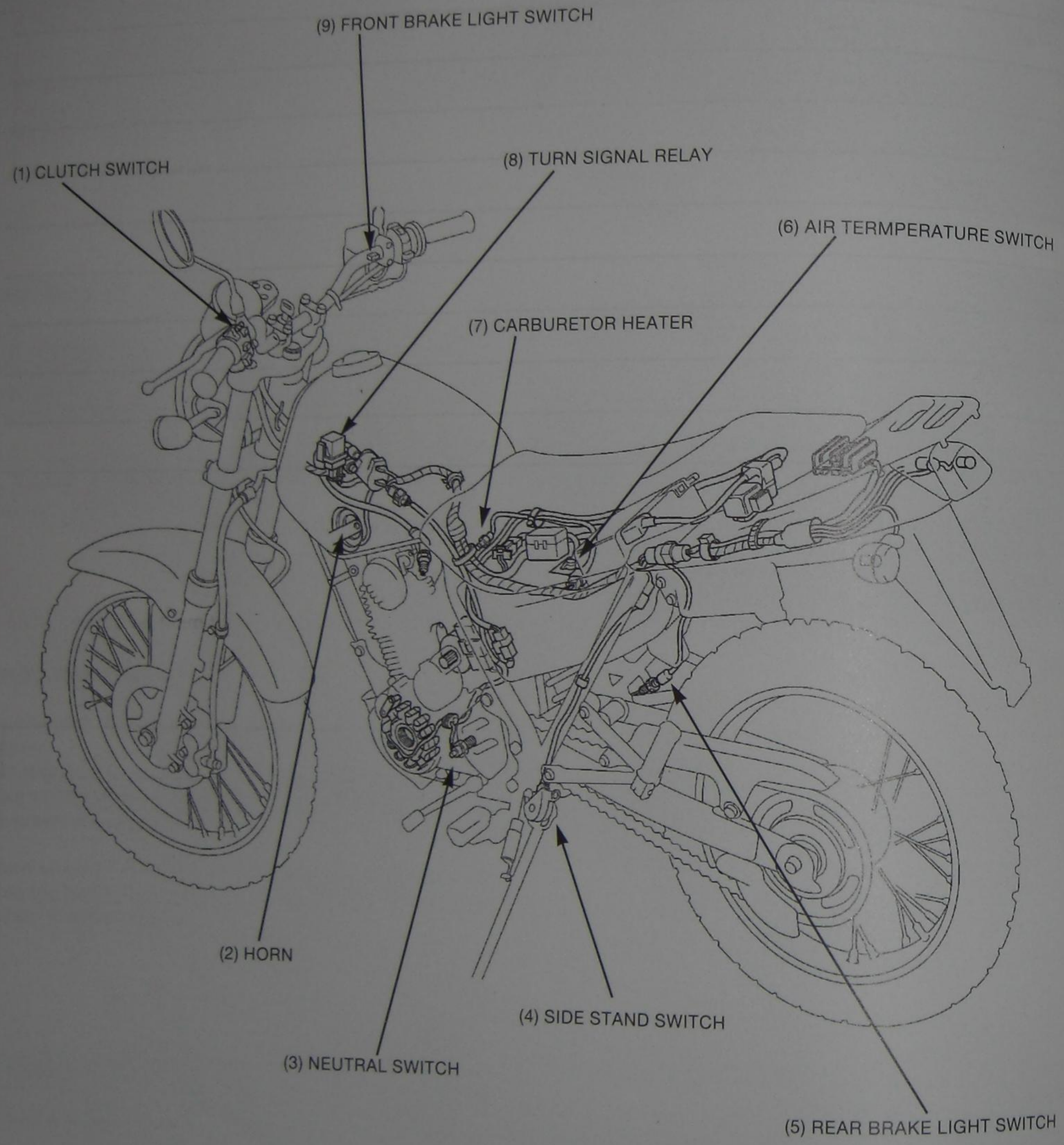
## MEMO



# 18. Lights/Meters/Switches

SEVICE INFORMATION 18-1
BULB REPLACEMENT 18-2
SPEEDOMETER/INSTRUMENT 18-4
BRAKE LIGHT SWITCH 18-5
CLUTCH SWITCH 18-6
IGNITION SWITCH 18-6
SIDE STAND SWITCH 18-6
NEUTRAL SWITCH 18-7
HANDLEBAR SWITCH 18-8
CARBURETOR HEATER 18-9
HORN 18-9
TURN SIGNAL RELAY 18-10

## Service Information

### GENERAL

⚠ **WARNING**

- **A halogen headlight bulb becomes very hot while the headlight is ON, and remains hot for a while after it is turned OFF. Be sure to let it cool down before servicing.**

- Note the following when replacing the halogen headlight bulb.
  - Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
  - If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
  - Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- All plastic connectors have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.

### SPECIFICATIONS

| Item | | | Specifications |
|---|---|---|---|
| Bulb | Headlight high/low beam | E type | 12 V - 35/35 W |
| | | Except E type | 12 V - 60/55 W |
| | Position light | | 12 V - 5 W |
| | Brake/taillight | | 12 V - 21/5 W |
| | Turn signal light | | 12 V - 10 W x 4 |
| | Meter light | | 12 V - 1.7 W |
| | High beam indicator | | 12 V - 1.7 W |
| | Neutral indicator | | 12 V - 1.7 W |
| | Turn signal indicator | | 12 V - 1.7 W |
| Fuse | Main fuse | | 20 A |
| | Sub fuse | | 10 A x 2, 15 A |

### TORQUE VALUE

| | | |
|---|---|---|
| Ignition switch mounting bolt | 26 N·m (2.7 kgf-m, 20 lbf-ft) | ALOC bolt: replace with a new one |

## Bulb Replacement

### HEADLIGHT AND POSITION LIGHT

**WARNING**

- **A halogen headlight bulb becomes very hot while the headlight is ON, and will remain hot for a while after it is turned OFF. Be sure to let it cool down before servicing.**

Remove the three screws and the headlight from the case.
Remove the dust cover from the headlight tabs.
Pull the socket out of the headlight and disconnect the headlight connector (s) to remove the headlight assembly.

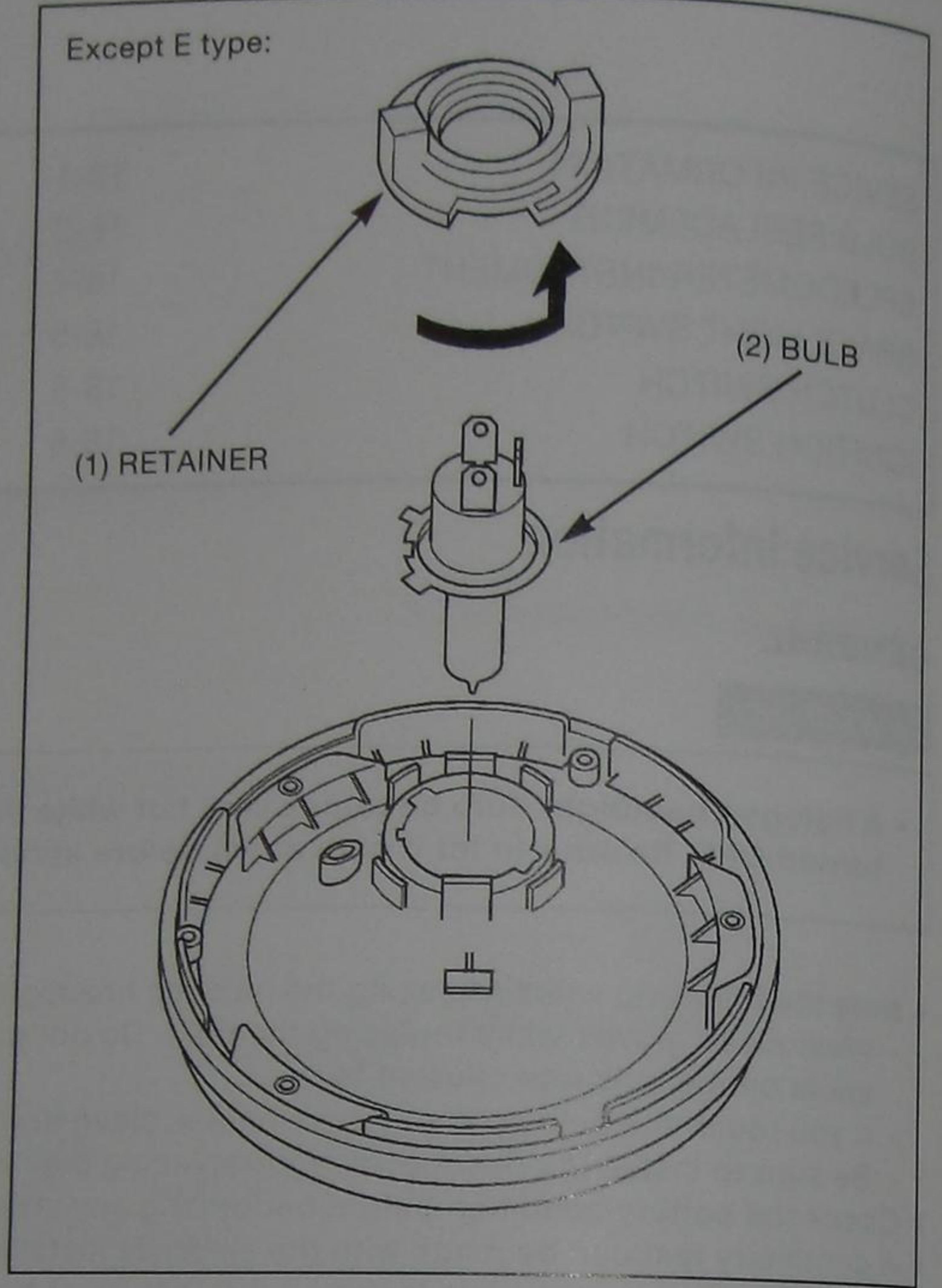
**POSITION LIGHT BULB**
Pull the bulb out of the socket and replace it with a new one.

**HEADLIGHT BULB**
Except E type:
Remove the headlight bulb retainer by turning counterclockwise and replace the headlight bulb with a new one.

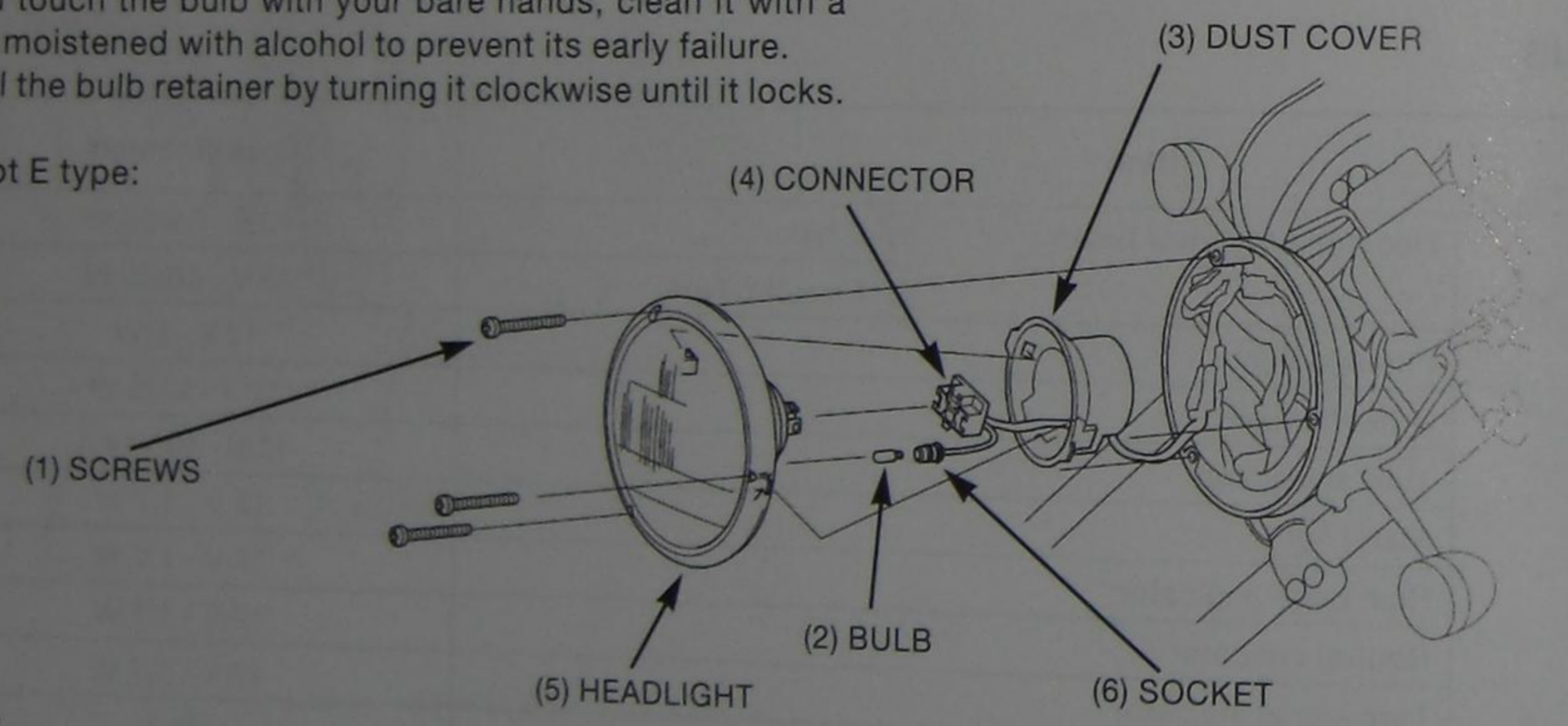
**CAUTION**

- **Avoid touching halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.**

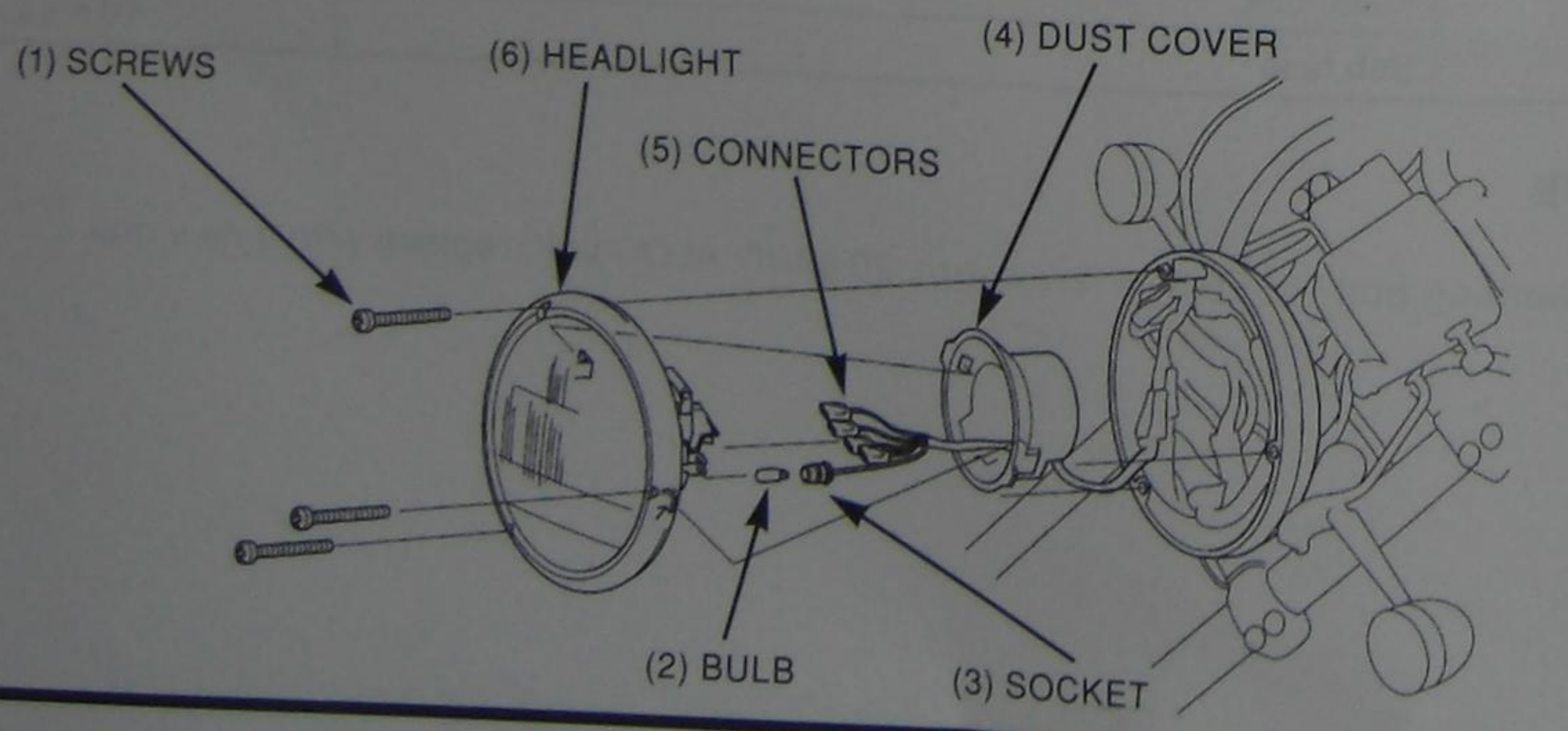
If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
Install the bulb retainer by turning it clockwise until it locks.


Except E type:
(1) RETAINER
(2) BULB

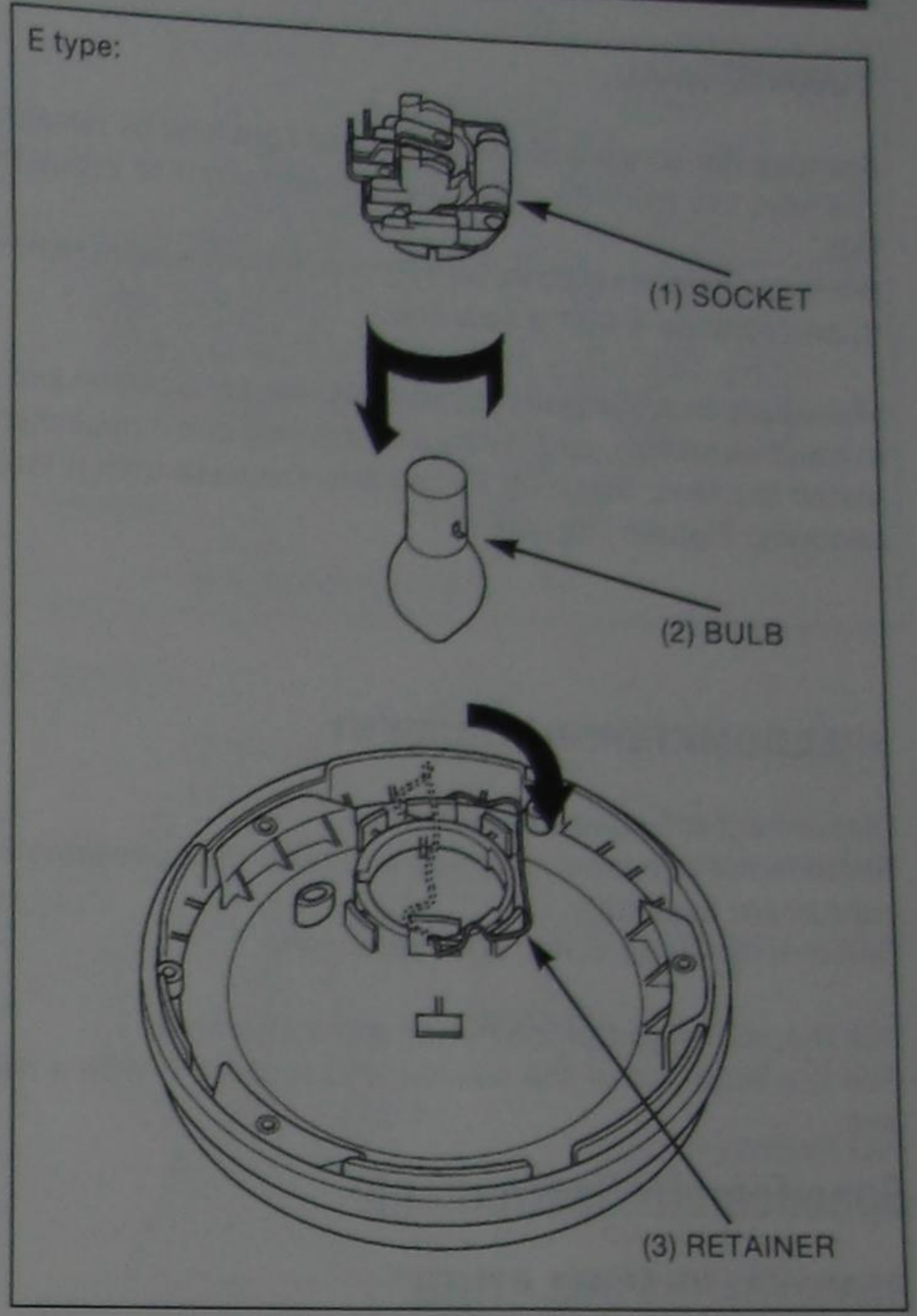
Except E type:


(3) DUST COVER
(4) CONNECTOR
(1) SCREWS
(2) BULB
(5) HEADLIGHT
(6) SOCKET

E type:


(1) SCREWS
(6) HEADLIGHT
(4) DUST COVER
(5) CONNECTORS
(2) BULB
(3) SOCKET

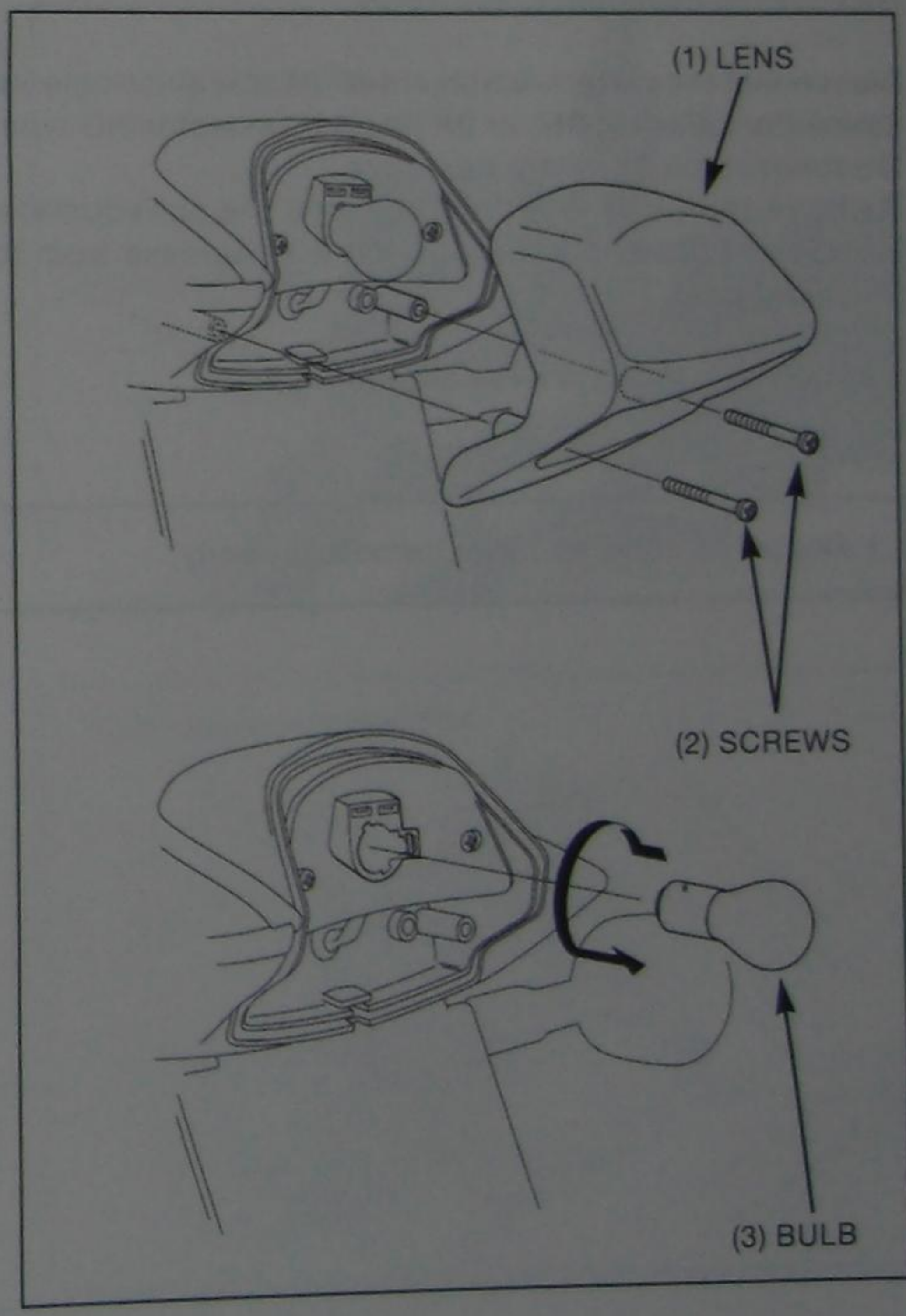
E type:
Unhook the bulb retainer and remove the socket.
While pushing the bulb in, turn it counterclockwise to remove it, and replace it with a new one.
Install the socket and hook the bulb retainer properly.


E type:
(1) SOCKET
(2) BULB
(3) RETAINER

**BRAKE/TAILLIGHT**

Remove the two screws and turn brake/taillight lens.
While pushing the bulb in, turn in counterclockwise to remove it, and replace it with a new one.

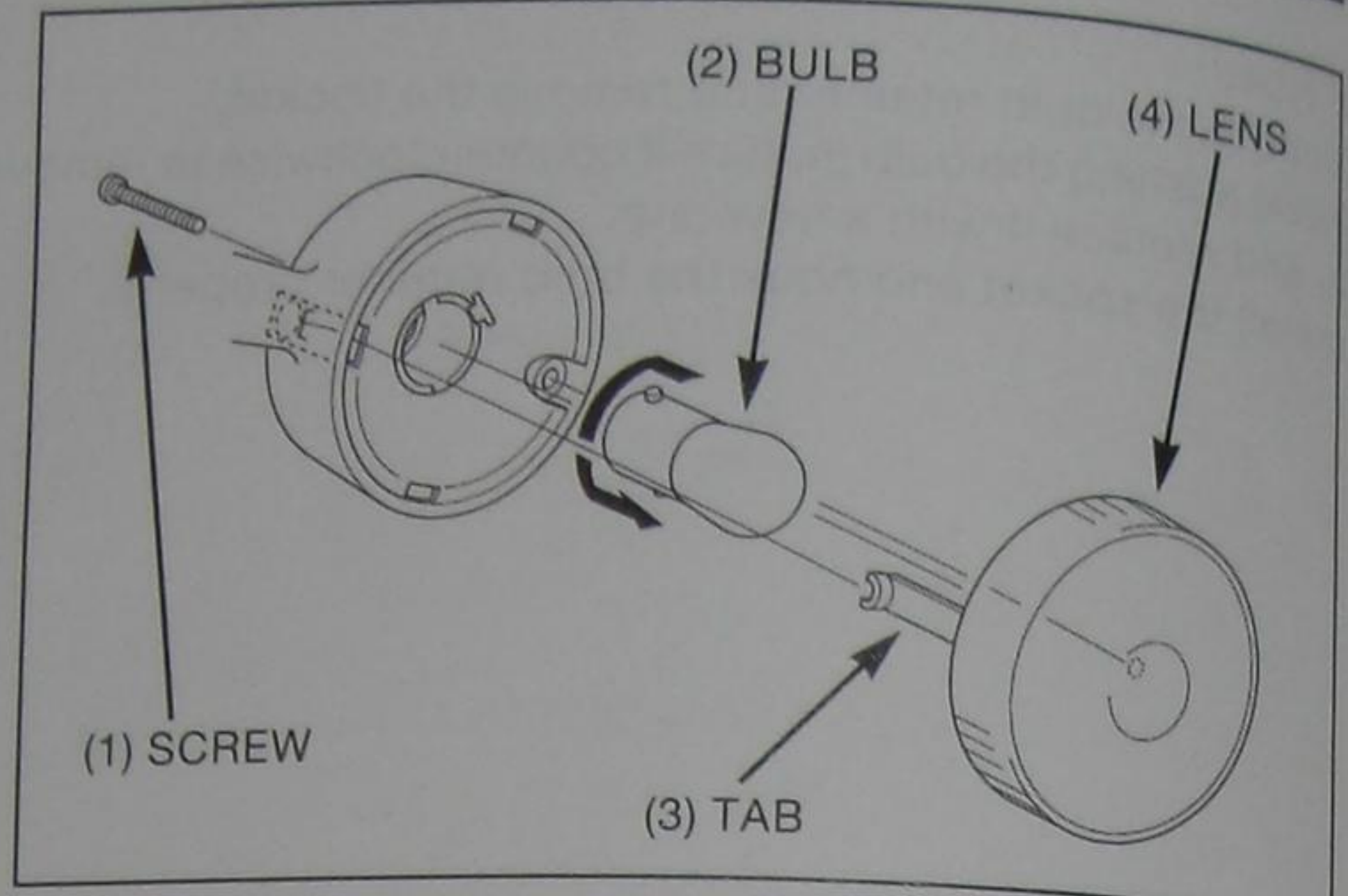
Make sure that the seal rubber is installed in position and is in good condition, and replace it with new one if necessary.
Install the lens and tighten the two screws.


(1) LENS
(2) SCREWS
(3) BULB

### TURN SIGNAL

Remove the screw and the turn signal light lens by releasing the lens tab from the case, being careful not to break the tab.
While pushing the bulb in, turn it counterclockwise to remove it, and replace it with a new one.

Make sure that the seal rubber is installed in position and is in good condition, and replace it with new one if necessary.
Install the lens, inserting its tab into the case until it locks securely. Tighten the screw.


(2) BULB
(4) LENS
(1) SCREW
(3) TAB

### SPEEDOMETER/INSTRUMENT

Disconnect the speedometer cable.
Remove the two mounting nuts and raise the speedometer/instrument assembly.
Remove the three screw and meter case.

Pull the socket out of the meter and instrument.
Pull the bulb out of the socket and replace it with a new one.

## Speedometer/Instrument

### REMOVAL/INSTALLATION

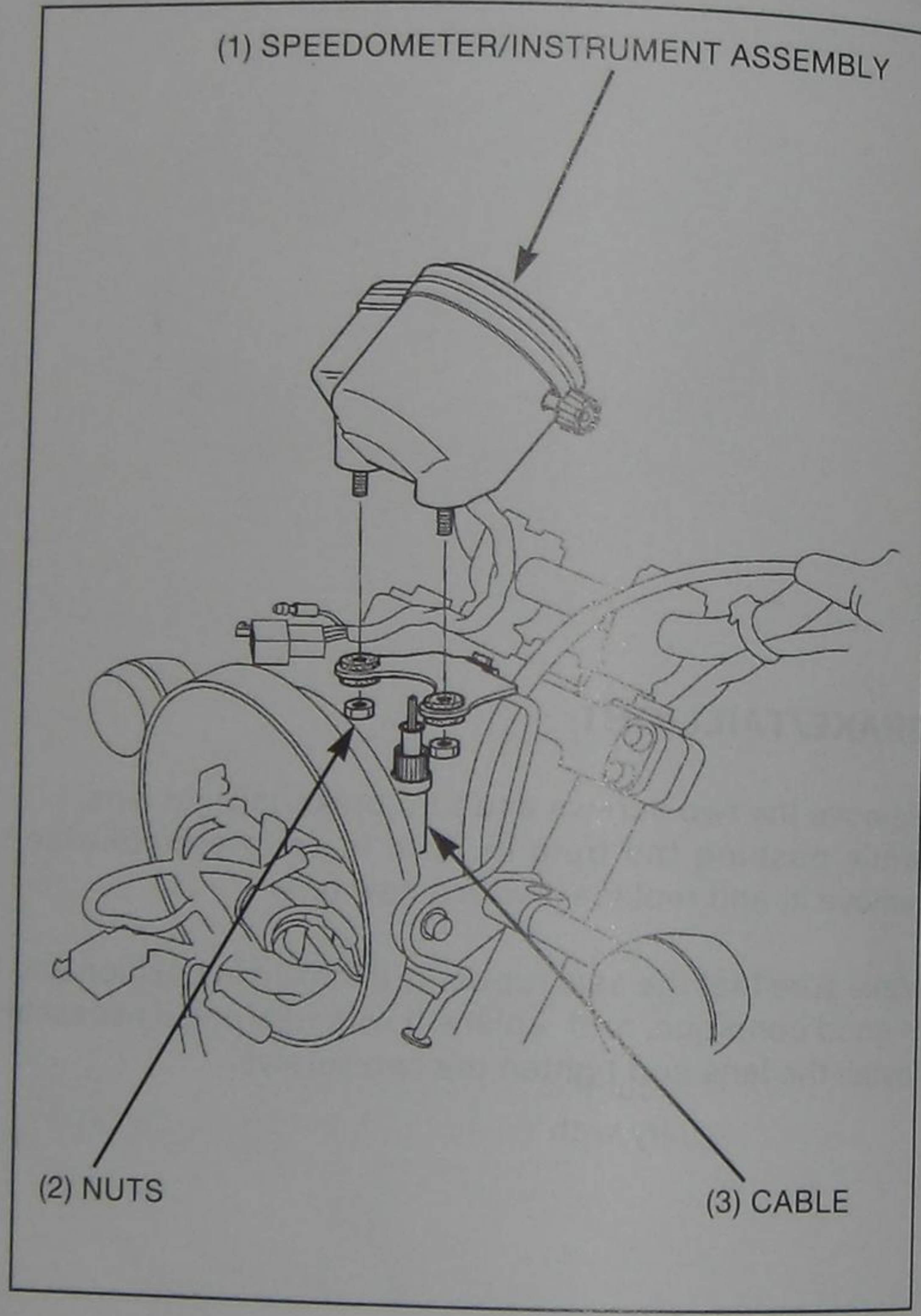
Remove the headlight (page 18-2).

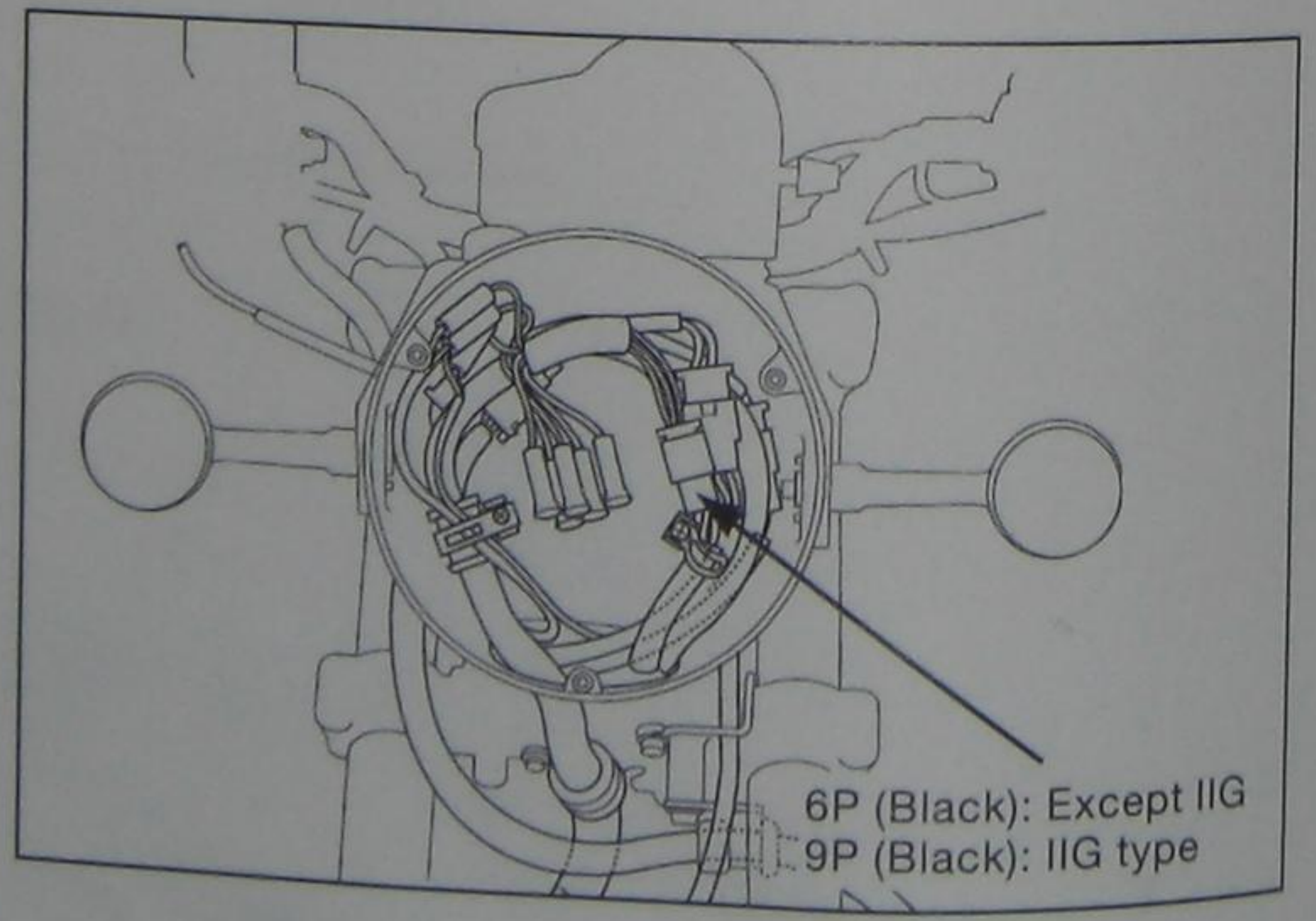
Disconnect the meter/instrument 6P (Black) and single lead connectors (Except IIG) or 9P (Black) connector (IIG type).
Disconnect the speedometer cable.
Remove the two mounting nuts and the speedometer/instrument assembly through the wire harness from the headlight case.

Installation is in the reverse order of removal.

NOTE:

- Route the cable and wire harness properly.


(1) SPEEDOMETER/INSTRUMENT ASSEMBLY
(2) NUTS
(3) CABLE


6P (Black): Except IIG
9P (Black): IIG type

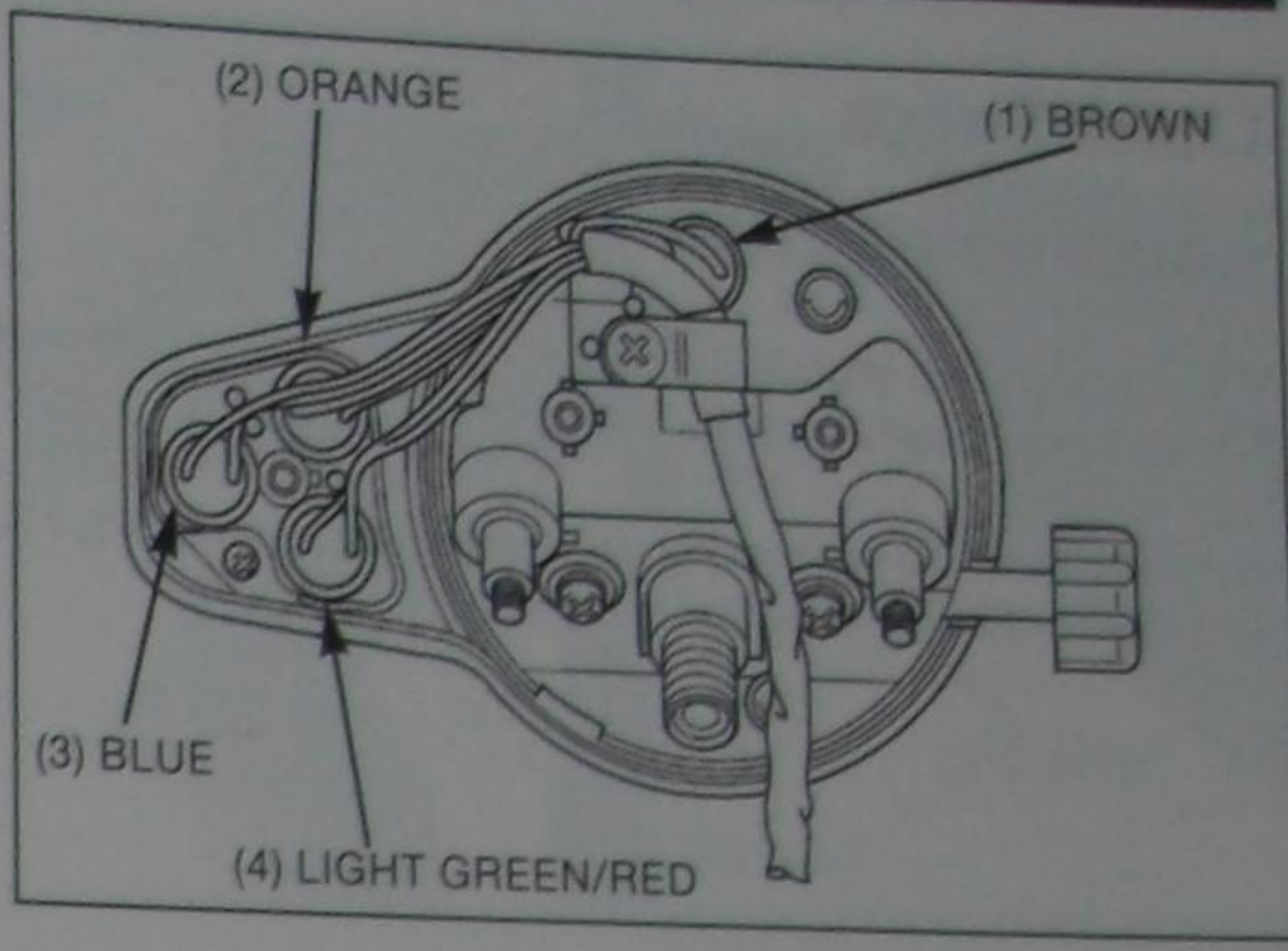
### DISASSEMBLY/ASSEMBLY

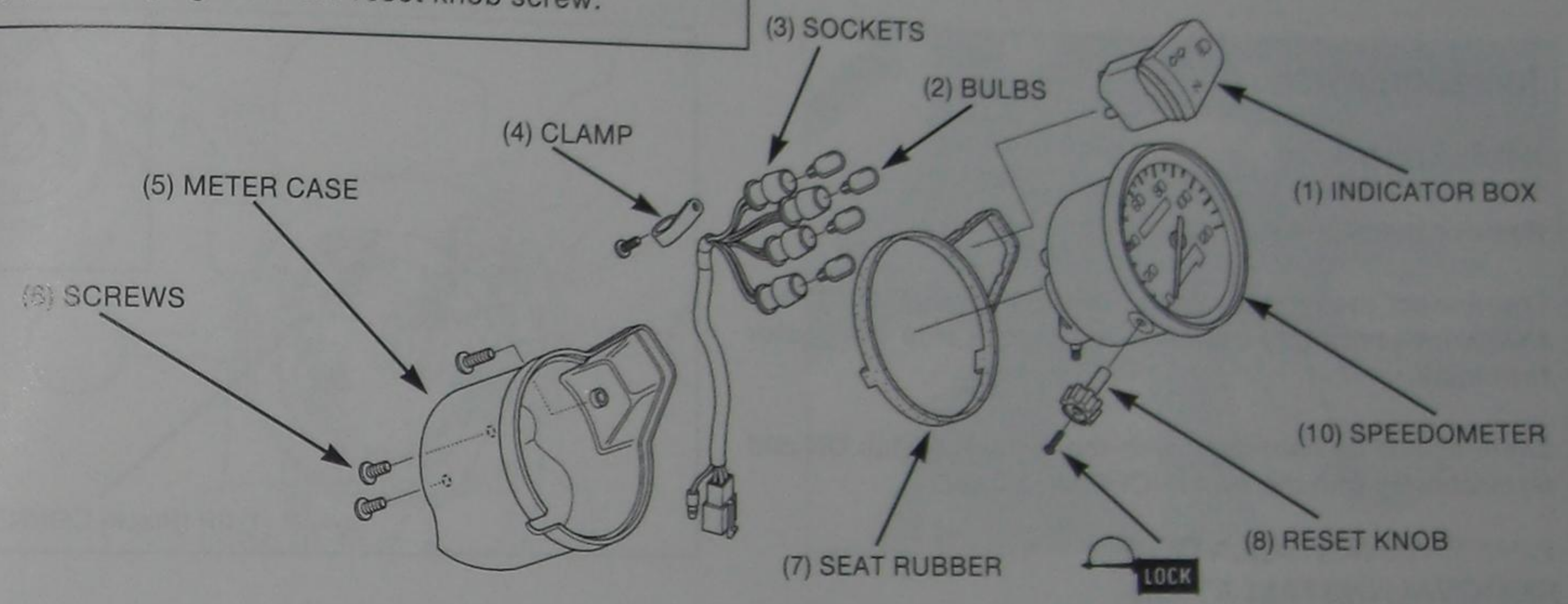
Remove the following:
- Three screws
- Meter case
- Speedometer and indicator box
- Seat rubber
- Clamp screw and harness clamp
- Bulb sockets
- Screw and tripmeter reset knob

Assembly is in the reverse order of disassembly.

NOTE:

- Apply locking agent to the reset knob screw.


(2) ORANGE
(1) BROWN
(3) BLUE
(4) LIGHT GREEN/RED

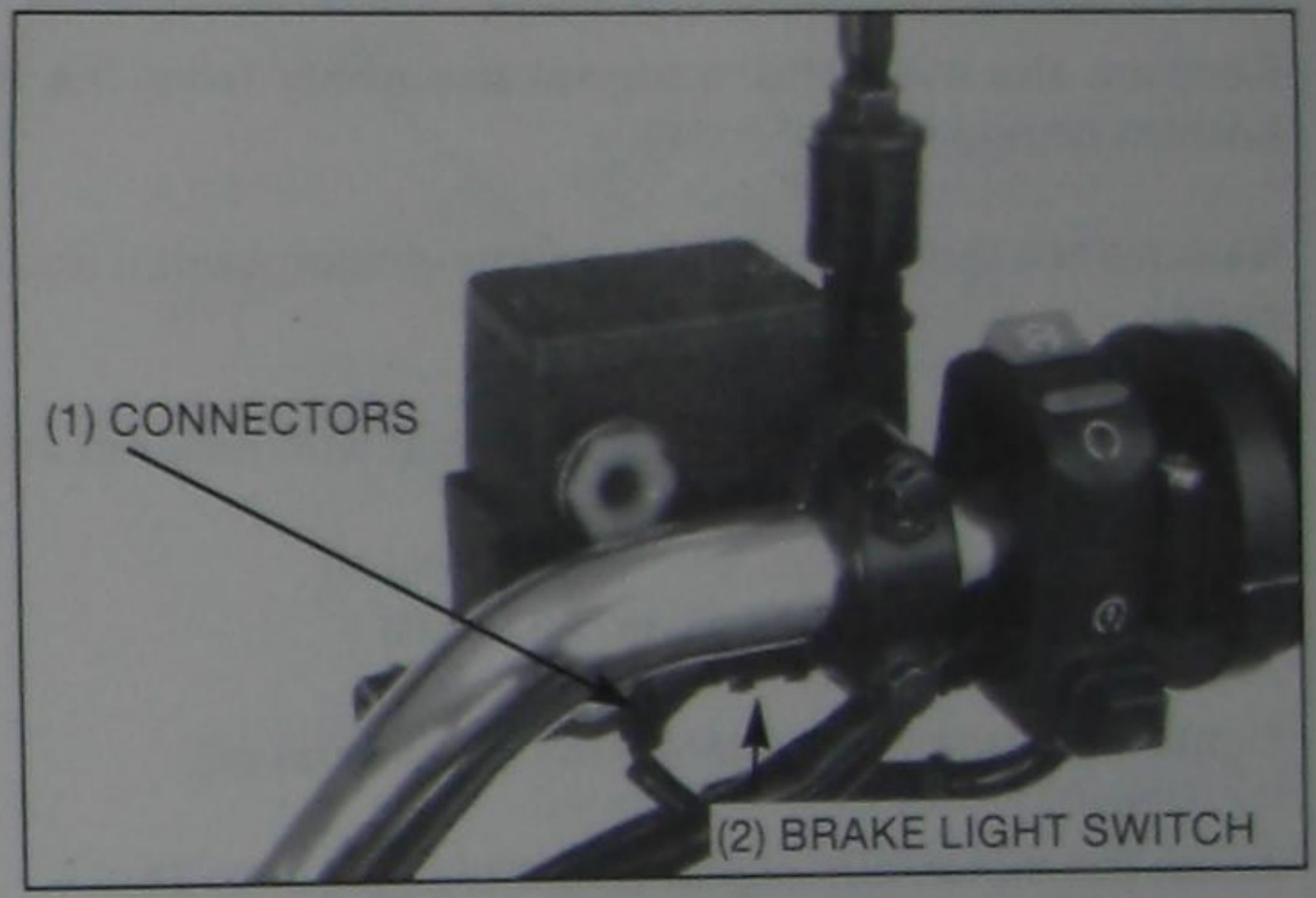

(3) SOCKETS
(2) BULBS
(4) CLAMP
(5) METER CASE
(1) INDICATOR BOX
(6) SCREWS
(10) SPEEDOMETER
(7) SEAT RUBBER
LOCK
(8) RESET KNOB

## Brake Light Switch

### INSPECTION

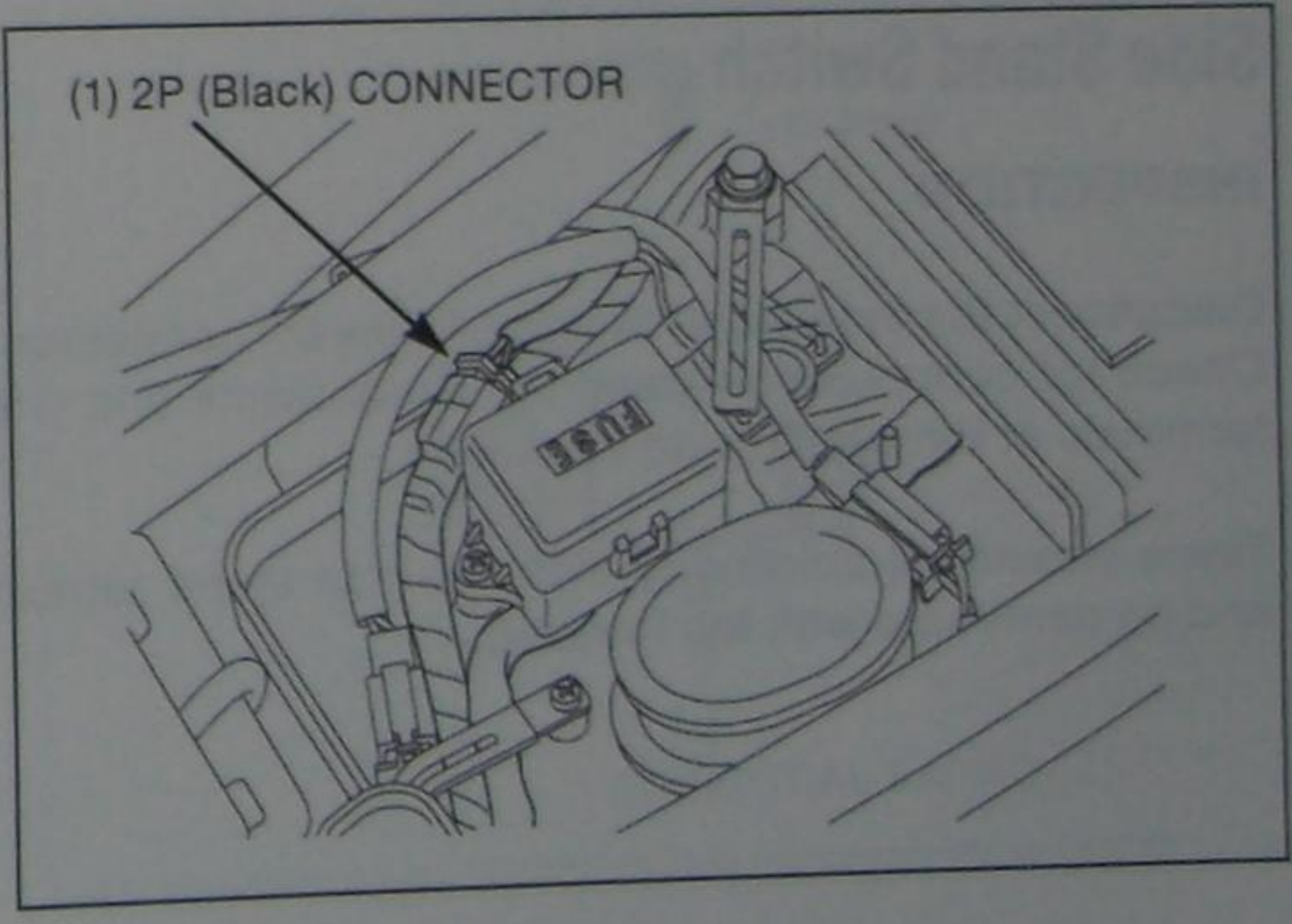
**FRONT**
Disconnect the front brake light switch wire connectors and check for continuity between the switch terminals.

There should be continuity with the front brake lever squeezed and no continuity with the lever released.


(1) CONNECTORS
(2) BRAKE LIGHT SWITCH

**REAR**
Remove the seat (page 2-2).
Disconnect the rear brake light switch 2P (Black) connector and check for continuity between the switch side connector terminals.

There should be continuity with the rear brake pedal depressed and no continuity with the pedal released.

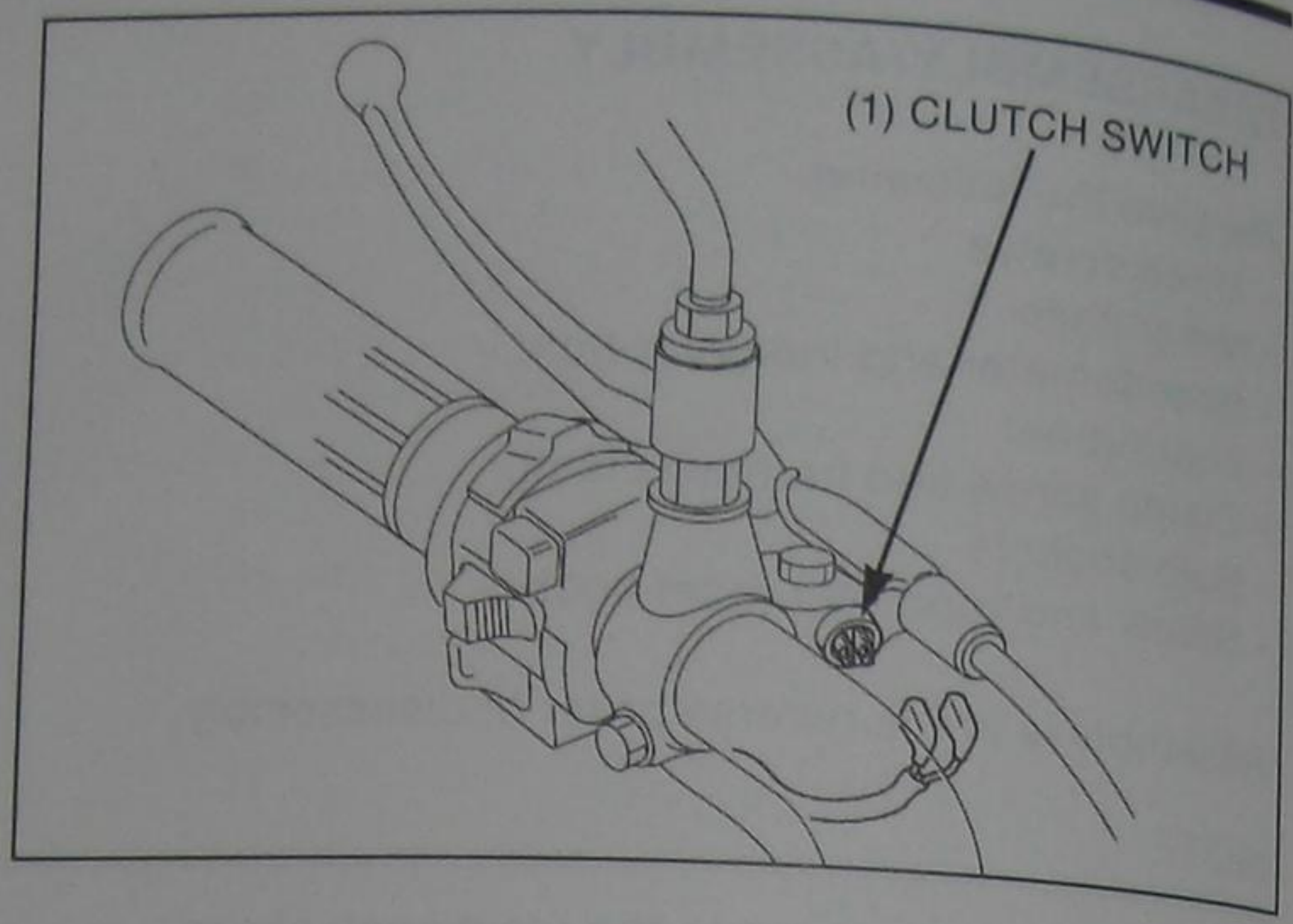

(1) 2P (Black) CONNECTOR

## Clutch Switch

### INSPECTION

Disconnect the clutch switch wire connectors and check for continuity between the switch terminals.

There should be continuity with the clutch lever squeezed and no continuity with the lever released.



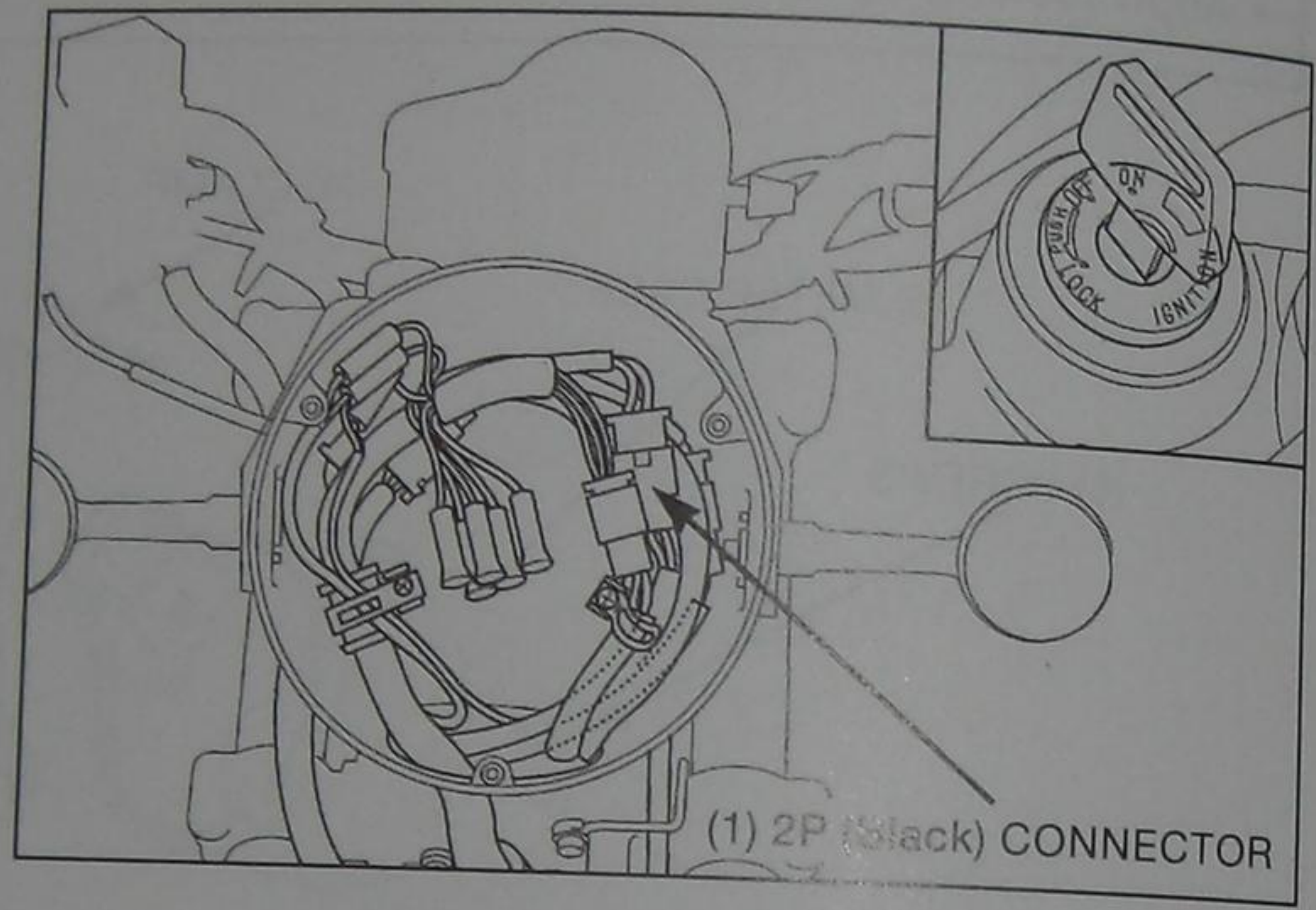
## Ignition Switch

### INSPECTION

Remove the headlight (page 18-2).

Disconnect the ignition switch 2P (Black) connector and check for continuity between the switch side connector terminals.

There should be continuity with the ignition switch ON and no continuity with the switch OFF and LOCK.



### REMOVAL/INSTALLATION

Remove the meter/turn signal assembly from the fork bottom bridge (page 12-17).

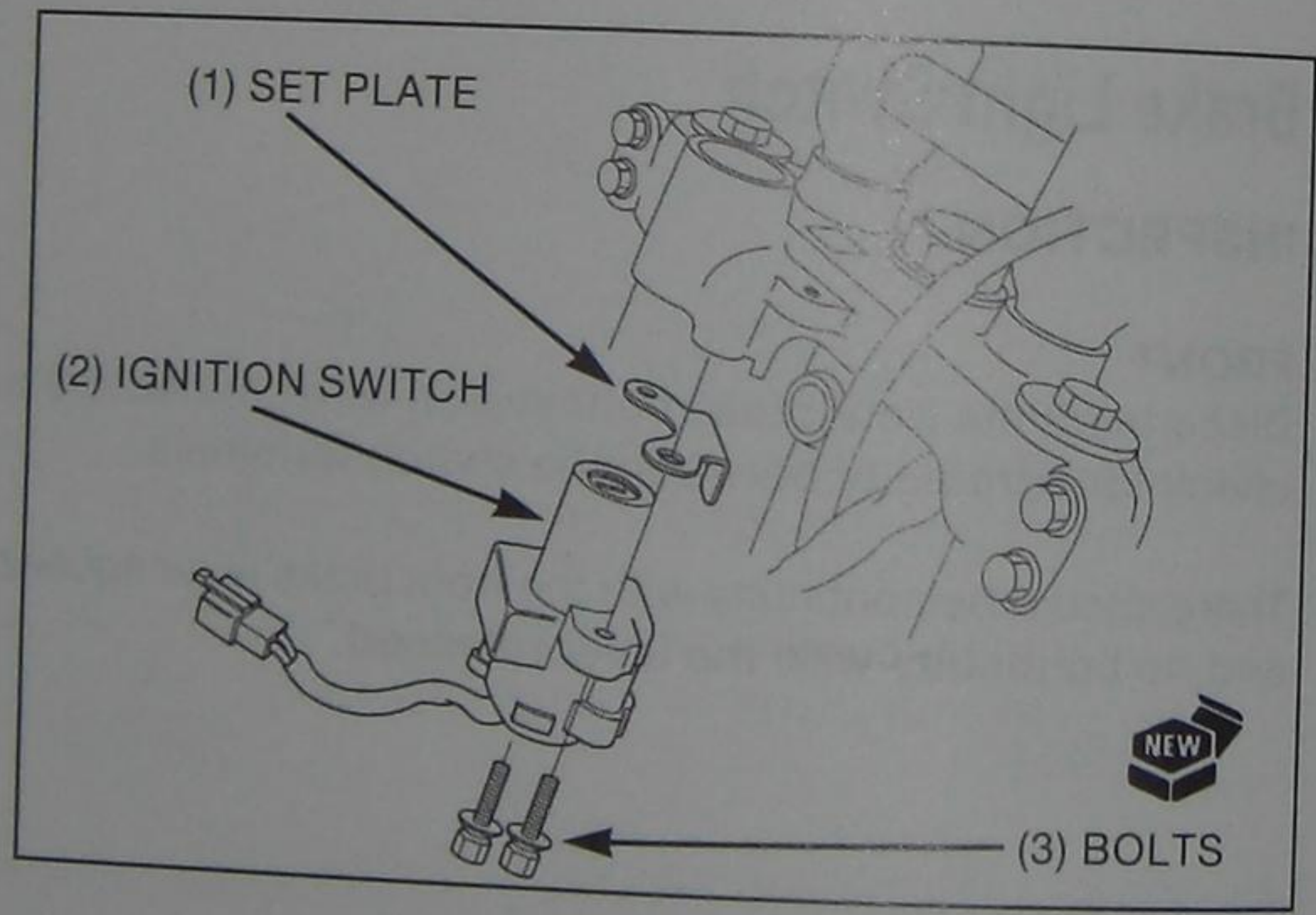
Remove the mounting bolts and the ignition switch and set plate.

Install the set plate and ignition switch with new mounting bolts.

**TORQUE: 26 N·m (2.7 kgf-m, 20 lbf-ft)**

Tighten the bolts until there ends are broken off.

Install the meter/turn signal assembly (page 12-21).

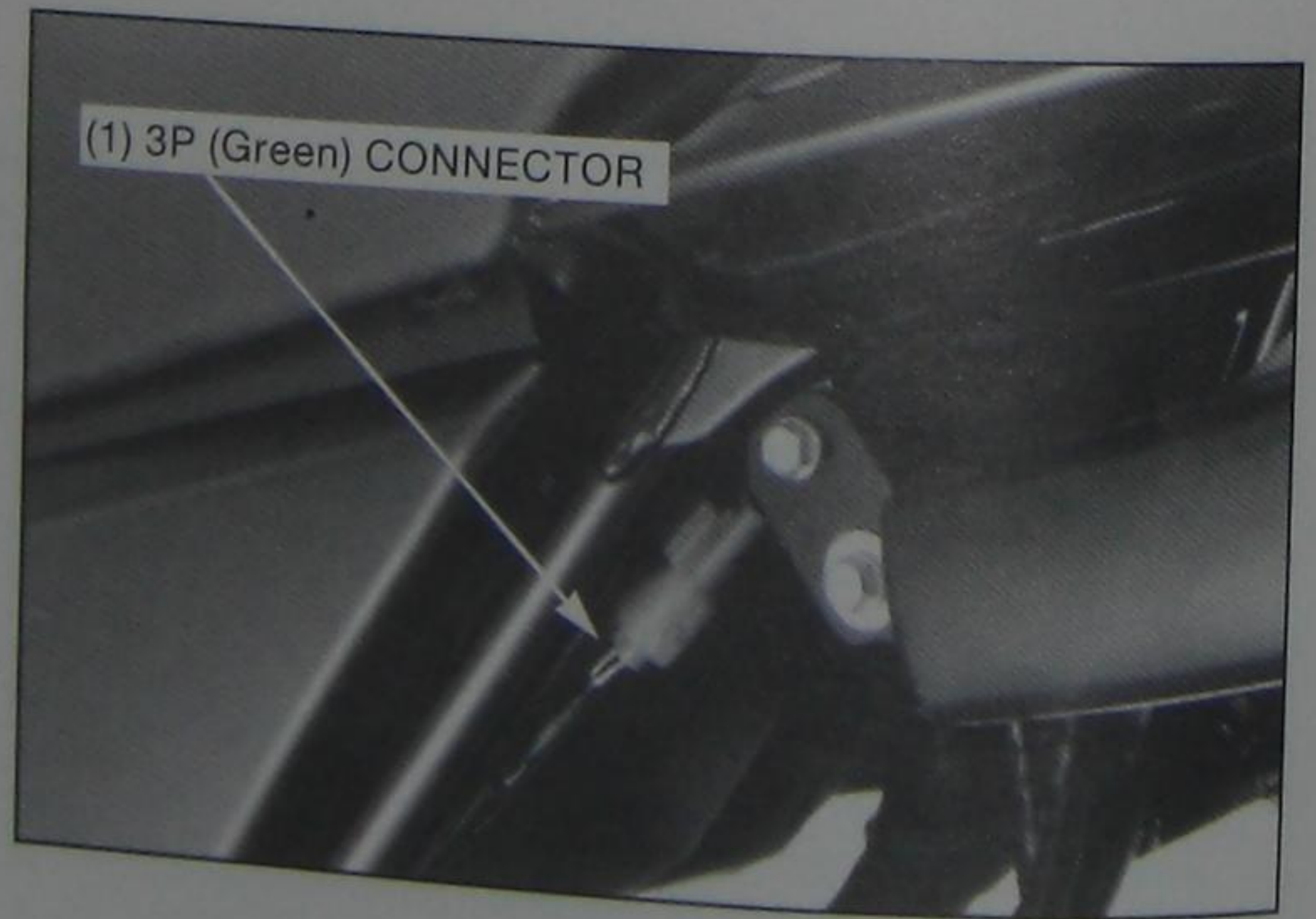


## Side Stand Switch

### INSPECTION

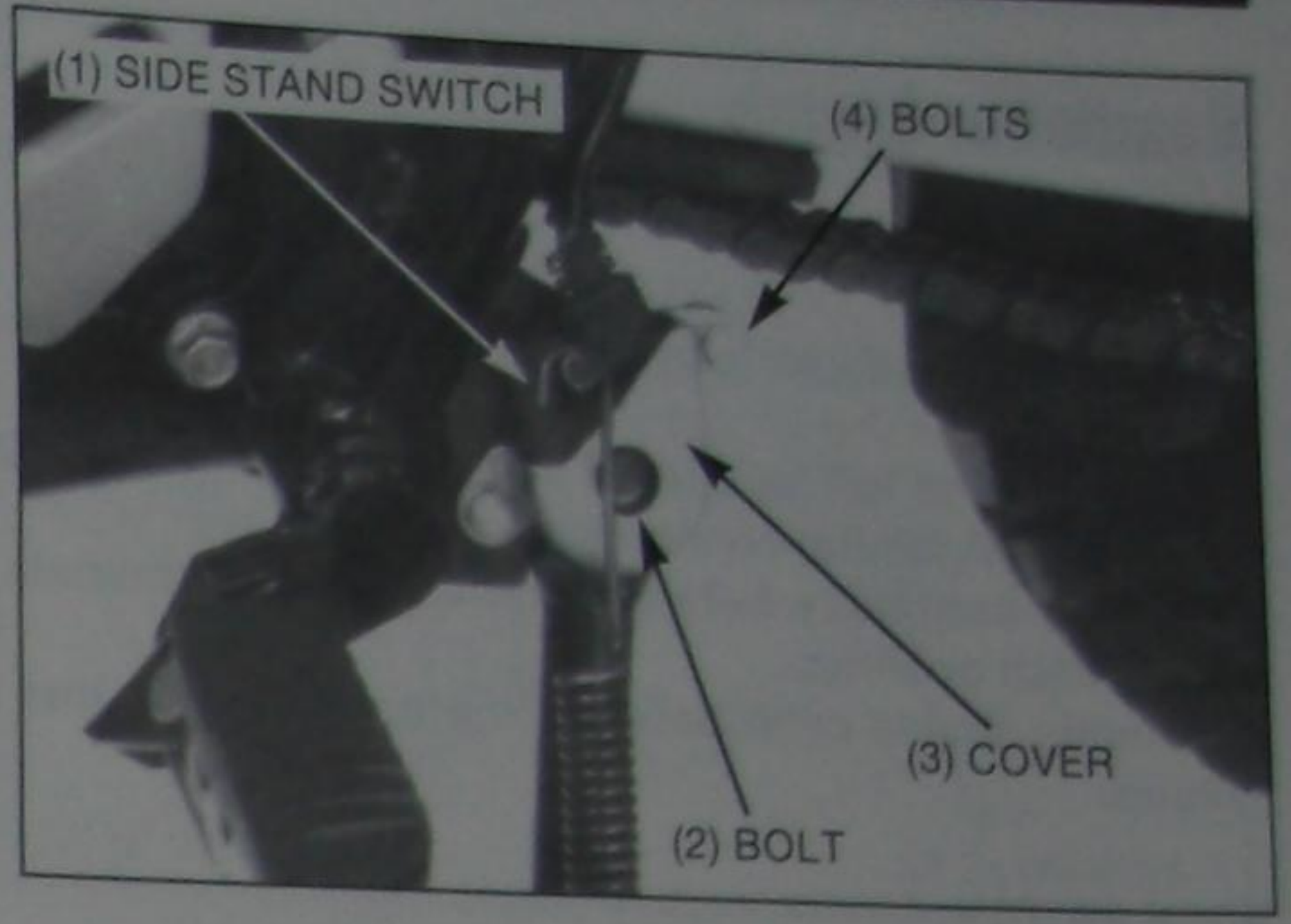
Disconnect the side stand switch 3P (Green) connector. Check for continuity between the Green/white and Green terminals at the switch side connector.

There should be continuity with the side stand retracted and no continuity with the lowered.



### REMOVAL

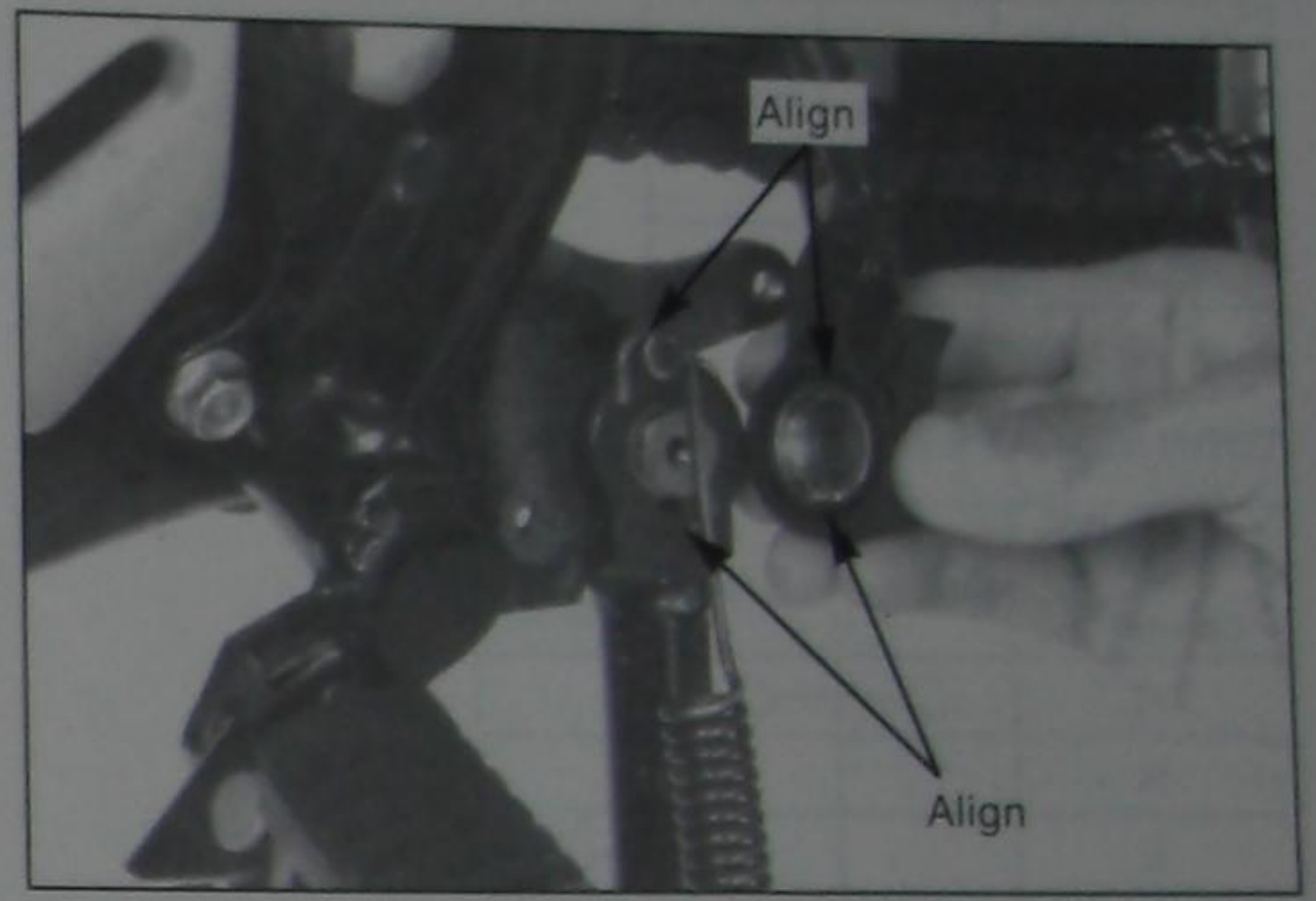
Disconnect the side stand switch 3P connector and release the switch wire from the frame clamps.
Remove the cover bolts and switch cover.
Remove the switch bolt and side stand switch.



### INSTALLATION

Install the side stand switch by aligning the switch pin with the side stand hole and the switch groove with the spring holding pin.
Install the switch bolt and tighten it.

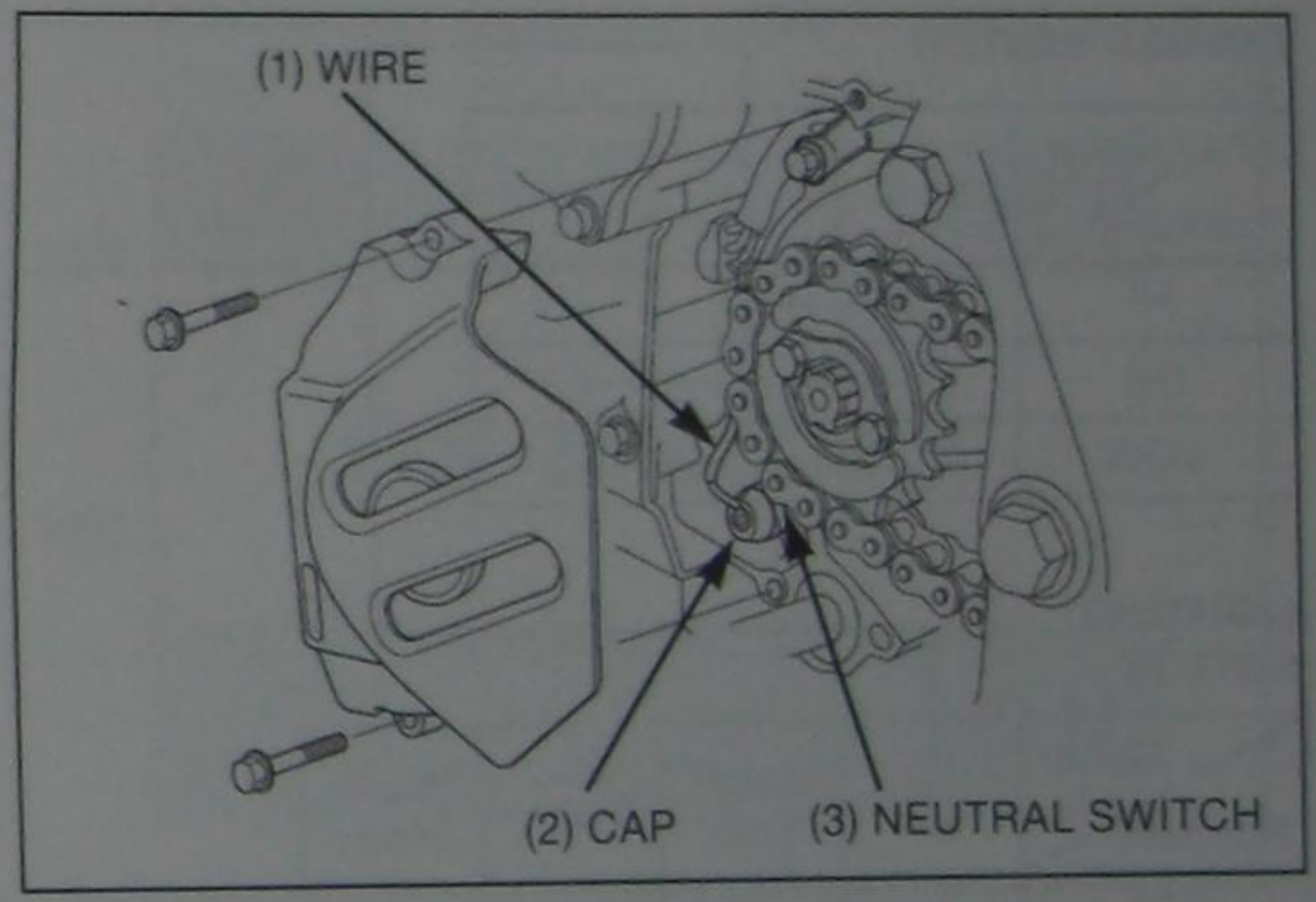
Install the switch cover and tighten the cover bolts.
Connect the 3P connector and secure the wire with the frame clamps.



## Neutral Switch

### INSPECTION

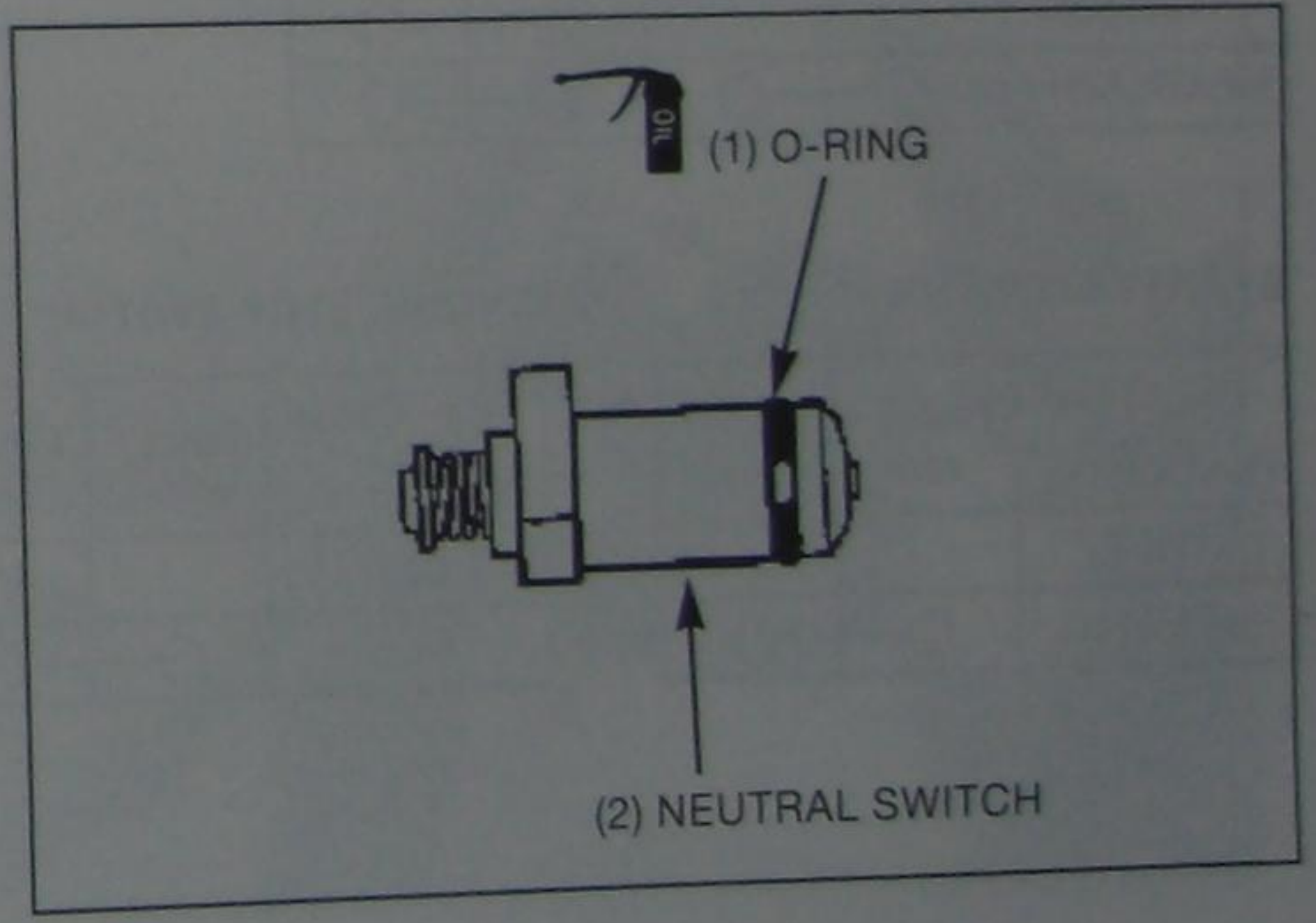
Remove the two bolts and the drive sprocket cover.
Remove the cap from the neutral switch and disconnect the wire by pushing the terminal flange.
Check for continuity between the switch terminal and engine ground.
There should be continuity with the transmission in neutral, and no continuity with the transmission in gear except neutral.



### REMOVAL/INSTALLATION

Disconnect the wire from the neutral switch (see above).
Pull the neutral switch out of the crankcase, being careful not to damage the terminal flange.

Coat a new O-ring with oil and install it into the switch groove.
Install the neutral switch into the crankcase until it is fully seated.
Connect the wire through the terminal hole by pushing the terminal flange.
Install the cap onto the switch securely.
Install the drive sprocket cover and tighten the two bolts.



## Handlebar Switch

### INSPECTION

Remove the headlight (page 19-2).

Disconnect the left handlebar switch 9P (White) and right handlebar 6P (White) connectors.
Check for continuity between the connector terminals in each switch position.
Continuity should exist between the color coded wires as follows:

**HORN SWITCH**

| Color / Position | Light green | Black/ brown |
|---|---|---|
| FREE | | |
| PUSH | ○ | ○ |

**TURN SIGNAL SWITCH**

| Color / Position | Orange | Gray | Light/ blue |
|---|---|---|---|
| R | ○ | ○ | |
| N | | | |
| L | | ○ | ○ |

**DIMMER SWITCH**

| Color / Position | Blue | ○ | White |
|---|---|---|---|
| HI | ○ | ○ | |
| (N) | ○ | ○ | ○ |
| LOW | | ○ | ○ |

**LIGHTING SWITCH**

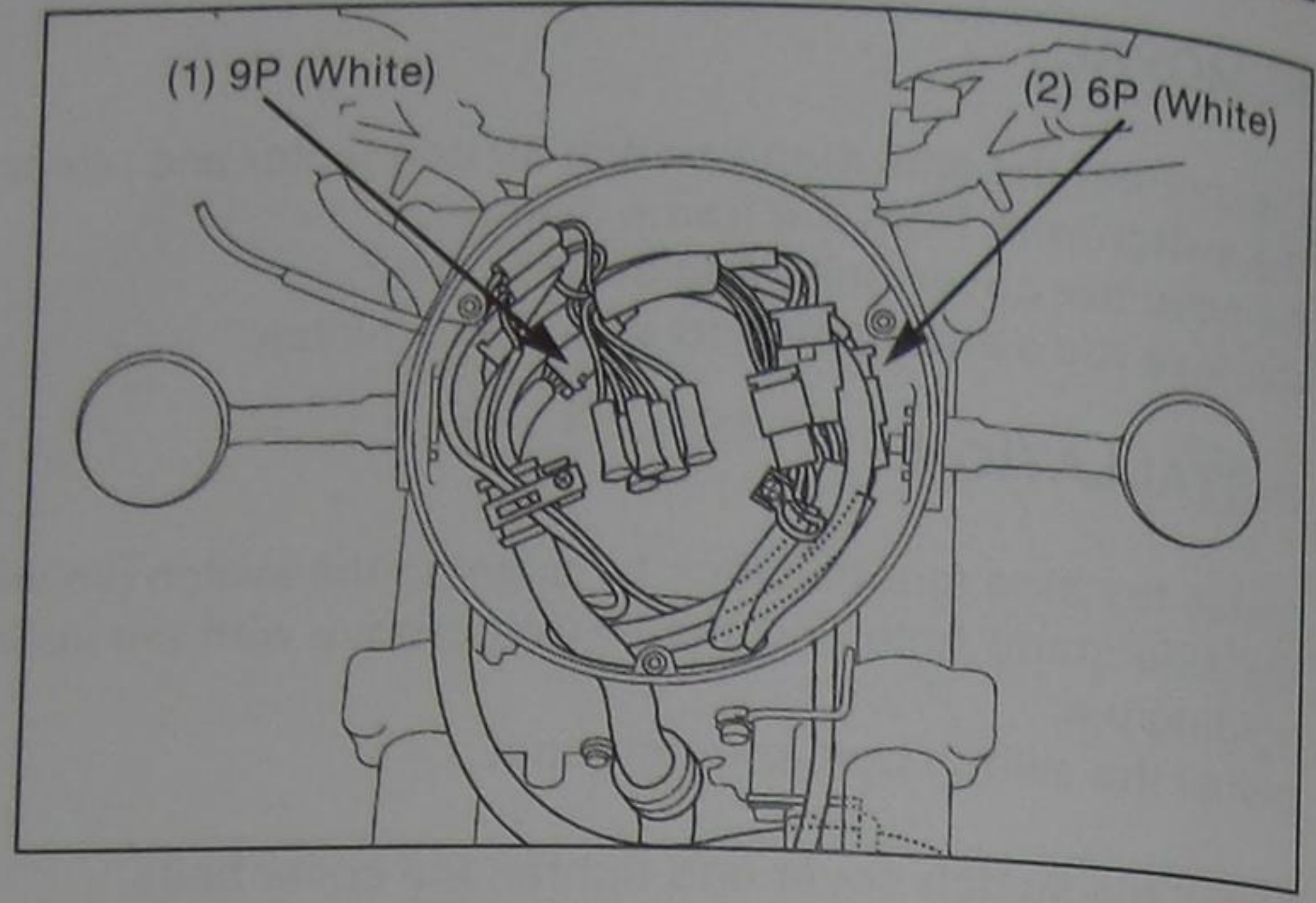
| Color / Position | ○ | Black/ blue | Brown | Black/ brown |
|---|---|---|---|---|
| OFF | | | | |
| POSITION | | | ○ | ○ |
| HEADLIGHT | ○ | ○ | ○ | ○ |

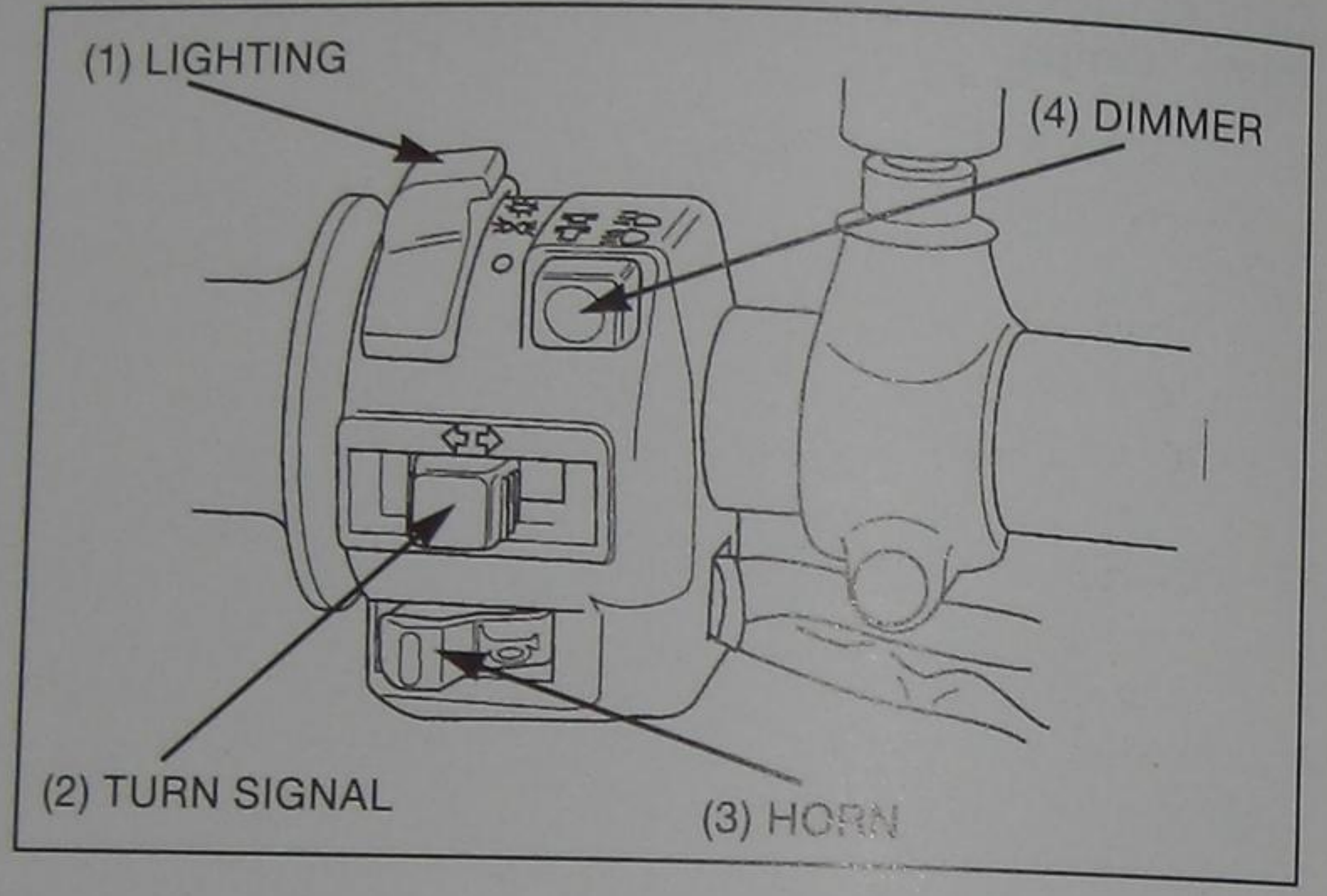
**STARTER SWITCH**

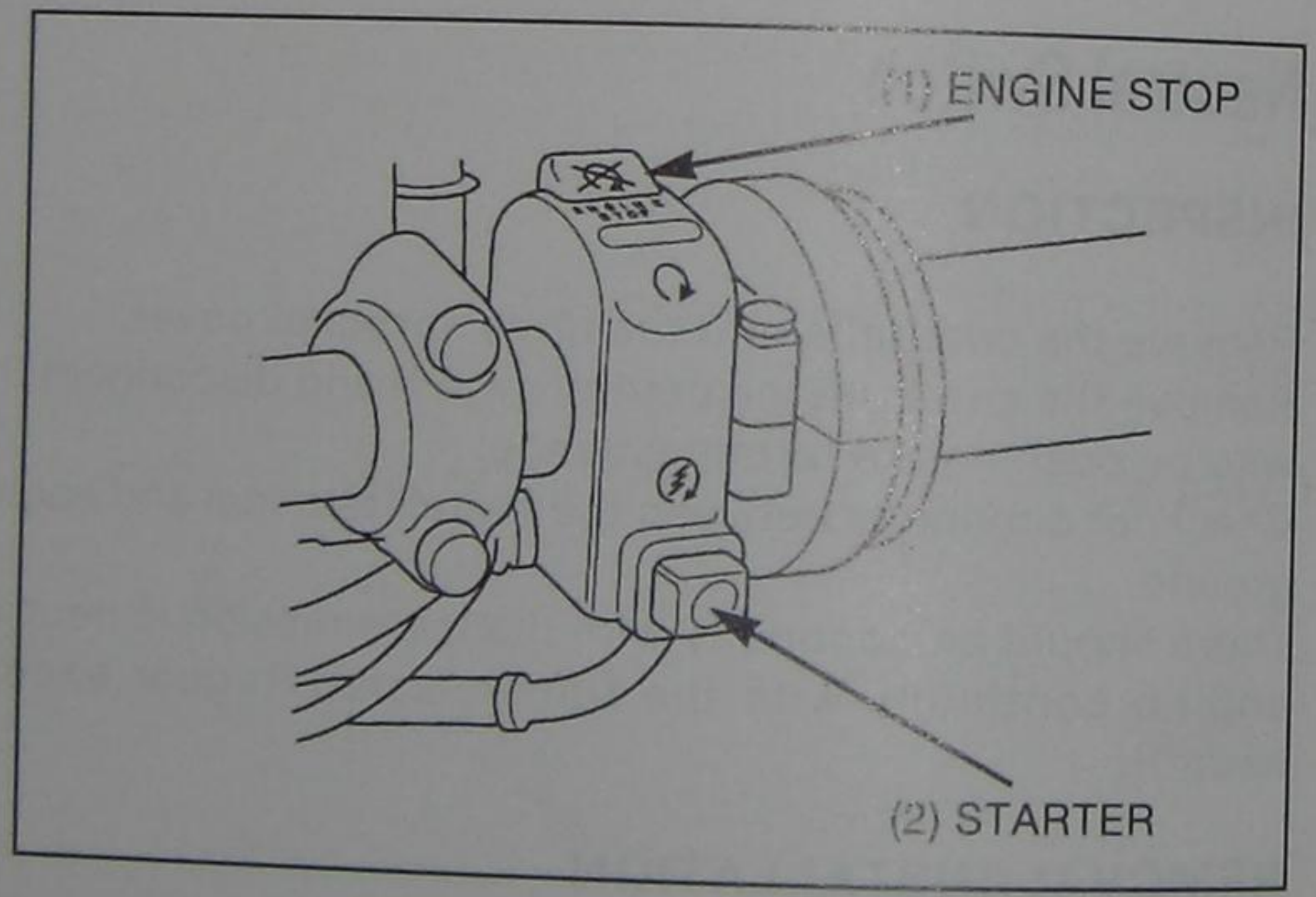
| Color / Position | Yellow/ red | Black/ white |
|---|---|---|
| FREE | | |
| PUSH | ○ | ○ |

**ENGINE STOP SWITCH**

| Color / Position | Black/ white | Black/ red |
|---|---|---|
| OFF | | |
| RUN | ○ | ○ |







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## Carburetor Heater

### SYSTEM INSPECTION

Remove the seat (page 2-2).

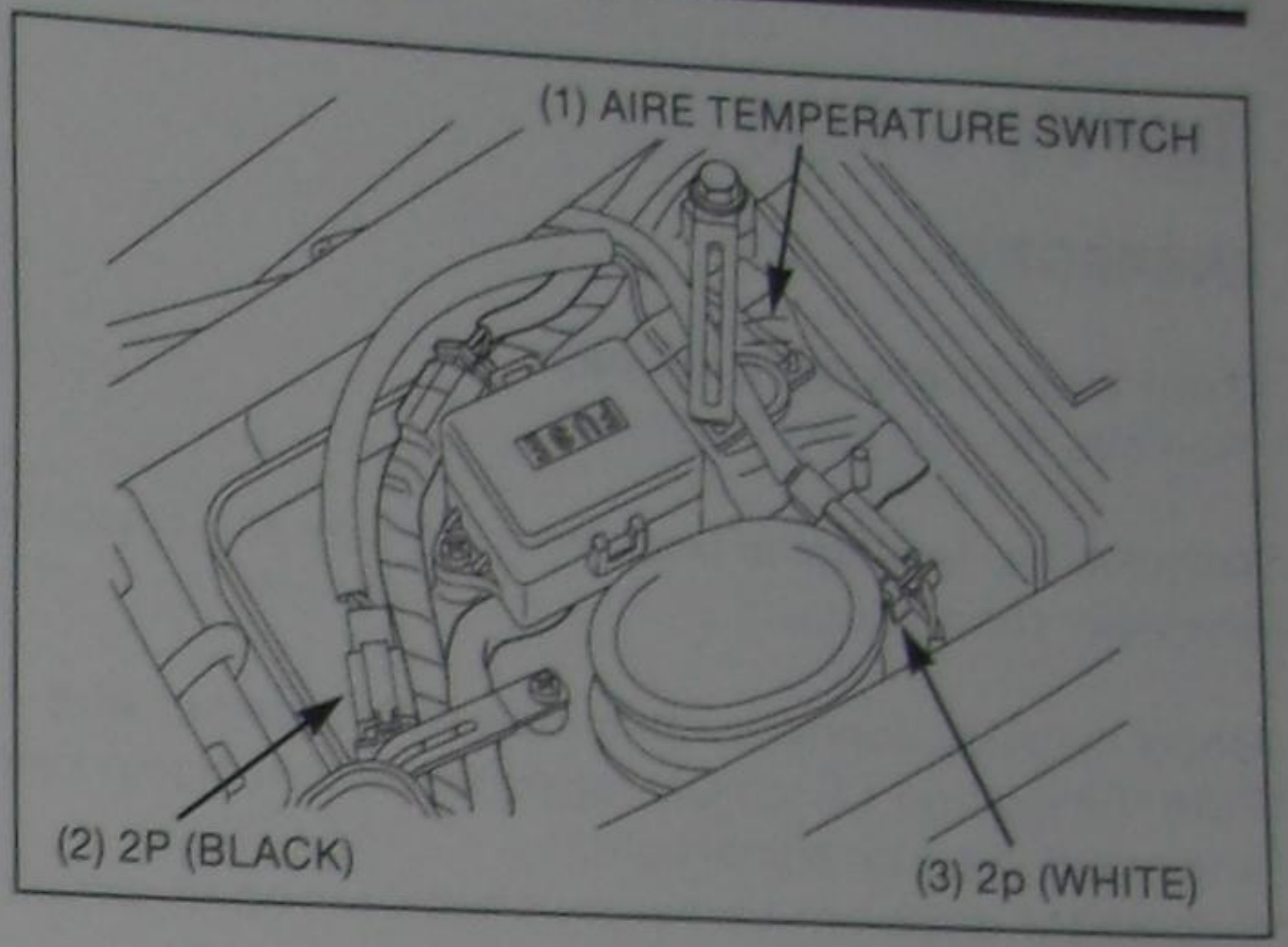
Disconnect the heater 2P (White) and air temperature switch 2P (Black) connectors.
Check for continuity between the Brown/blue terminals at the harness side connectors. There should be continuity.
If there is no continuity, check for open circuit in Brown/blue wire.

Measure the voltage between the Black/brown (+) and Green (-) wire terminals at the harness side connectors with the ignition switch ON.
There should be battery voltage.
If there is no voltage, check for open circuit in Black/brown and Green wires.

If the wires are OK, check as follows:
Measure the resistance between the heater side connector terminals of the 2P (White) connector.

**STANDARD: 4-10 Ω (20°C/68°F)**

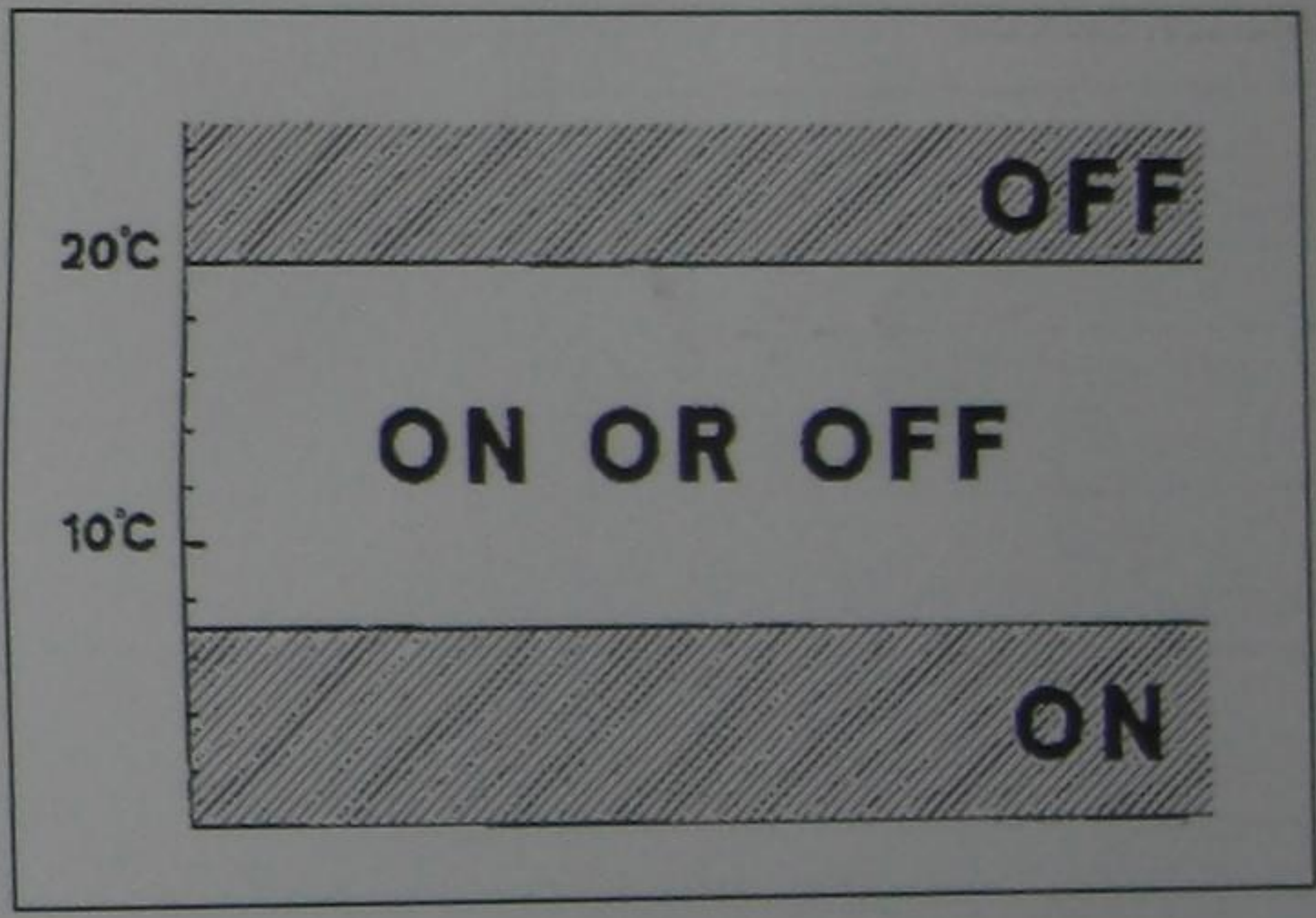
If the resistance is out of above ranges, replace the carburetor heater.



If the carburetor heater resistance is normal, check for continuity between the air temperature switch side connector terminals of the 2P (Black) connector.

**Above: 20°C (68°F): No continuity**
**Below: 7°C (45°F): Continuity**

If there is abnormal, replace the air temperature switch.

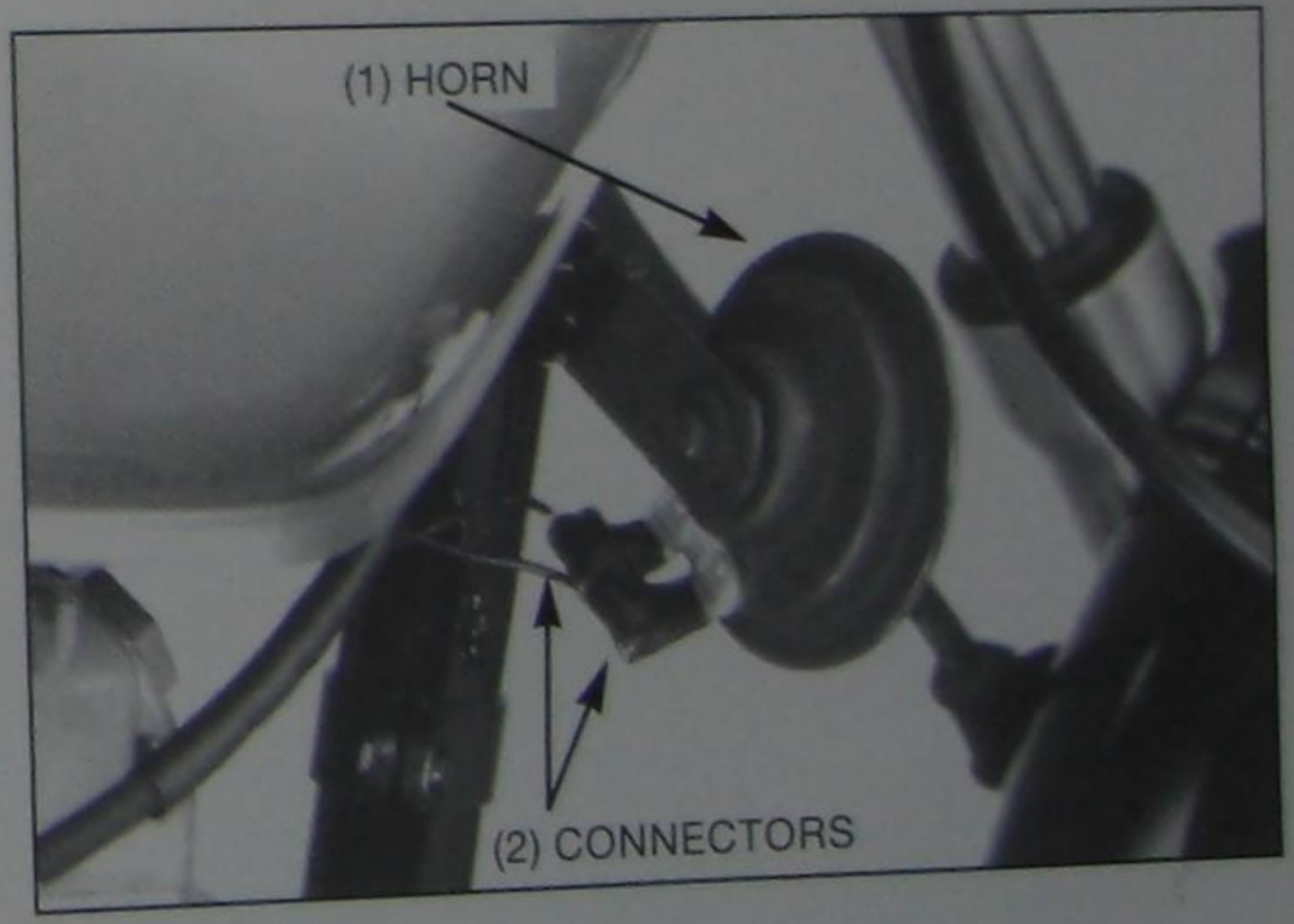


## Horn

### INSPECTION

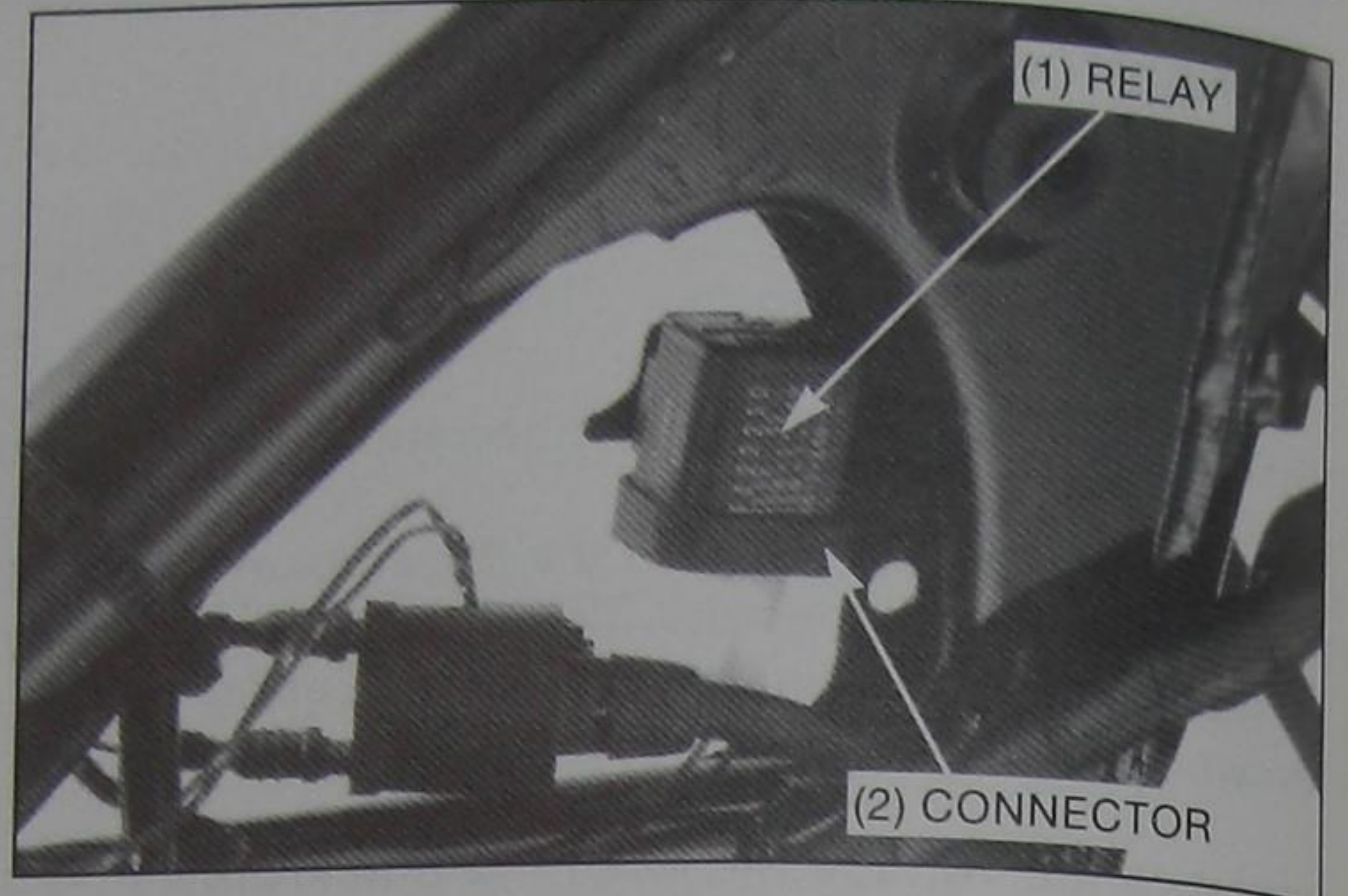
Disconnect the wire connectors from the horn.
Connect a 12 V battery to the horn terminals.

The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



## Turn Signal Relay

### INSPECTION


(1) RELAY
(2) CONNECTOR

**Turn signal light does not blink**
Remove the fuel tank (page 2-2).

Remove the turn signal relay from the stay and disconnect the relay connector.

Short the relay connector terminals with a jumper wire.
Turn the ignition switch ON, operate the turn signal switch and check the turn signal light.
If the light does not come on, check for open circuit in wires.

If the light comes on, check the connector terminals for loose or poor contact.
If the connector terminals are OK, replace the turn signal relay.

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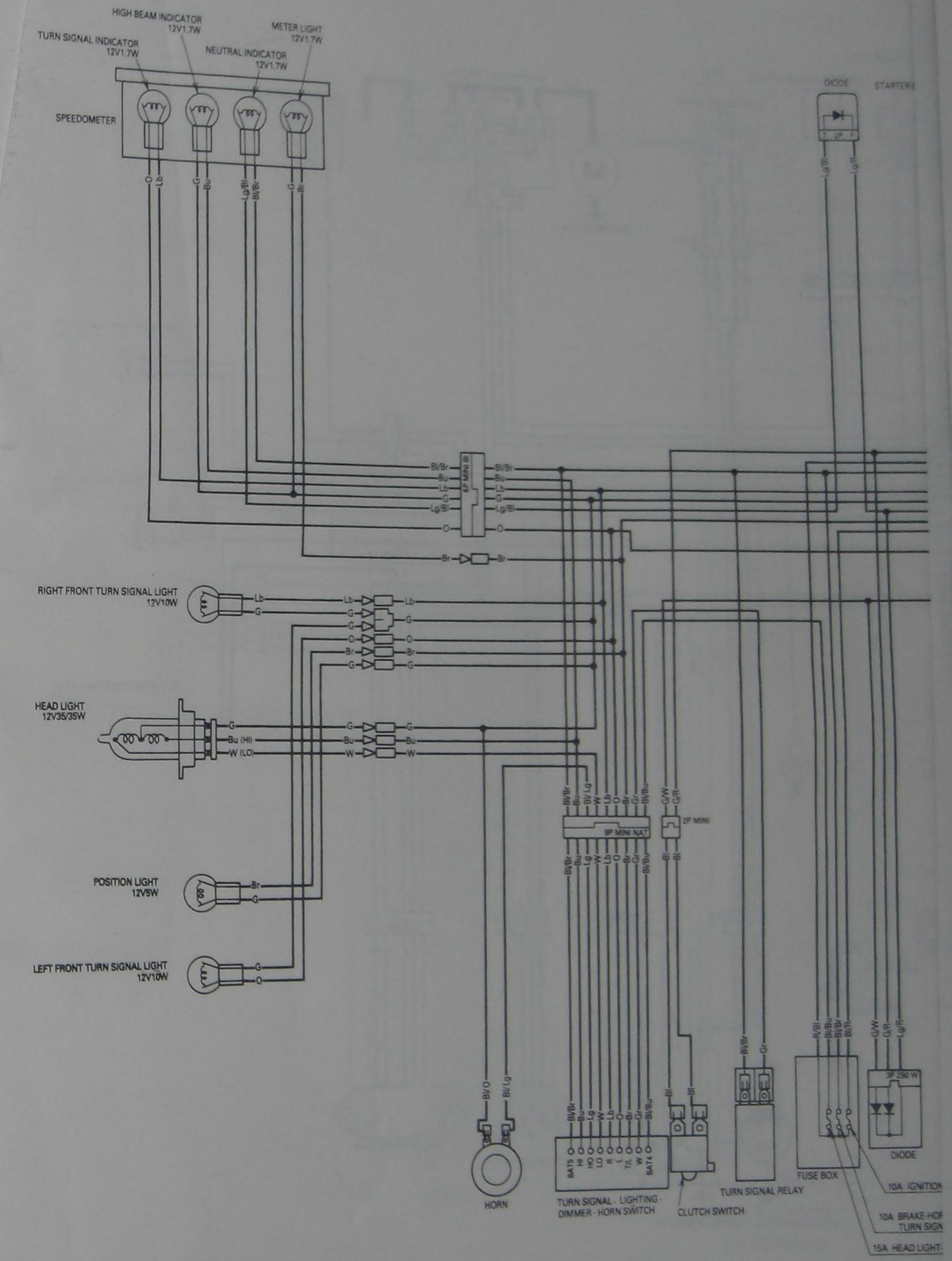
E type:


HIGH BEAM INDICATOR 12V1.7W
TURN SIGNAL INDICATOR 12V1.7W
NEUTRAL INDICATOR 12V1.7W
METER LIGHT 12V1.7W
SPEEDOMETER
O
Lb
G
Bu
Lg/Bl
Bl/Br
Br
6P MINI
DIODE
STARTER
RIGHT FRONT TURN SIGNAL LIGHT 12V10W
HEAD LIGHT 12V35/35W
Bu (HI)
W (LO)
POSITION LIGHT 12V5W
LEFT FRONT TURN SIGNAL LIGHT 12V10W
Bl/O
Bl/Lg
9P MINI NAT
2P MINI
G/W
G/R
Bl
Gr
Bl/Bu
BAT5
HI
HO
LO
R
L
T/L
W
BAT4
R/Bl
Bl/R
3P 250 W
HORN
TURN SIGNAL · LIGHTING · DIMMER · HORN SWITCH
CLUTCH SWITCH
TURN SIGNAL RELAY
FUSE BOX
DIODE
10A IGNITION
10A BRAKE·HOR TURN SIGN
15A HEAD LIGHT·
Bu/W

SWITCH CONTINUITY

| STARTER SWITCH | | |
|---|---|---|
| ⚡ | ST | IG |
| FREE | | |
| PUSH | ○ | ○ |
| CORD COLOR | Y/R | Bl/W |

| ENGINE STOP SWITCH | | |
|---|---|---|
| | IG | BAT7 |
| ⊗ OFF | | |
| ↻ RUN | ○ | ○ |
| CORD COLOR | Bl/W | Bl/R |

| IGNITION SWITCH | | |
|---|---|---|
| | BAT1 | BAT2 |
| ON | ○ | ○ |
| OFF | | |
| LOCK | | |
| CORD COLOR | R | R/Bl |

| LIGHTING SWITCH | | | | |
|---|---|---|---|---|
| | (HL) | BAT4 | TL | BAT5 |
| ● | | | | |
| ≡OO≡ | | | ○ | ○ |
| ☼ | ○ | ○ | ○ | ○ |
| CORD COLOR | | Bl/Bu | Br | Bl/Br |

| DIMMER SWITCH | | | |
|---|---|---|---|
| | HI | (HL) | LO |
| ≣D | ○ | ○ | |
| (N) | ○ | ○ | ○ |
| ≣D | | ○ | ○ |
| CORD COLOR | Bu | | W |

Bu/W

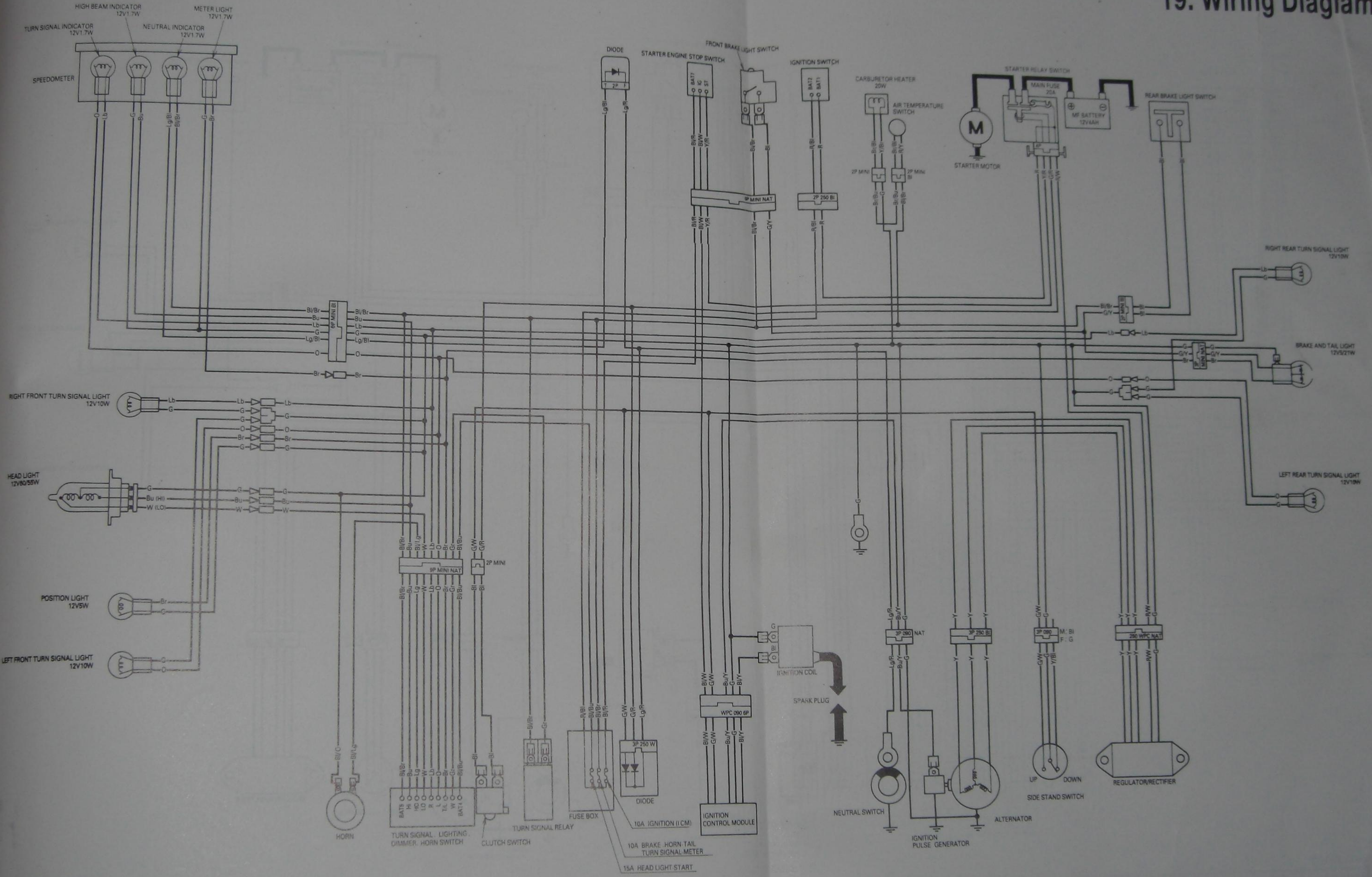
| TURN SIGNAL SWITCH | | | |
|---|---|---|---|
| | L | W | R |
| ⇦ | ○ | ○ | |
| (N) | | | |
| ⇨ | | ○ | ○ |
| CORD COLOR | O | Gr | Lb |

| HORN SWITCH | | |
|---|---|---|
| 📯 | HO | BAT6 |
| FREE | | |
| PUSH | ○ | ○ |
| CORD COLOR | Lg | Bl/Br |

(1) RELAY
(2) CONNECTOR

# 19. Wiring Diagram

## ED, F types:


HIGH BEAM INDICATOR 12V1.7W
METER LIGHT 12V1.7W
TURN SIGNAL INDICATOR 12V1.7W
NEUTRAL INDICATOR 12V1.7W
SPEEDOMETER
DIODE
STARTER ENGINE STOP SWITCH
FRONT BRAKE LIGHT SWITCH
IGNITION SWITCH
CARBURETOR HEATER 20W
AIR TEMPERATURE SWITCH
2P MINI
2P MINI Bl
STARTER RELAY SWITCH
MAIN FUSE 20A
MF BATTERY 12V4AH
STARTER MOTOR
REAR BRAKE LIGHT SWITCH
9P MINI NAT
2P 250 Bl
RIGHT REAR TURN SIGNAL LIGHT 12V10W
BRAKE AND TAIL LIGHT 12V5/21W
LEFT REAR TURN SIGNAL LIGHT 12V10W
RIGHT FRONT TURN SIGNAL LIGHT 12V10W
HEAD LIGHT 12V60/55W
Bu (HI)
W (LO)
POSITION LIGHT 12V5W
LEFT FRONT TURN SIGNAL LIGHT 12V10W
9P MINI NAT
2P MINI
3P 250 W
IGNITION COIL
SPARK PLUG
WPC 090 6P
3P 090 NAT
3P 250 Bl
3P 090 M: Bl F: G
250 WPC NAT
HORN
TURN SIGNAL, LIGHTING, DIMMER, HORN SWITCH
CLUTCH SWITCH
TURN SIGNAL RELAY
FUSE BOX
DIODE
IGNITION CONTROL MODULE
10A IGNITION (ICM)
10A BRAKE, HORN, TAIL TURN SIGNAL, METER
15A HEAD LIGHT, START
NEUTRAL SWITCH
IGNITION PULSE GENERATOR
ALTERNATOR
UP
DOWN
SIDE STAND SWITCH
REGULATOR/RECTIFIER

SWITCH CONTINUITY

| STARTER SWITCH | ST | IG |
|---|---|---|
| FREE | | |
| PUSH | ○ | ○ |
| CORD COLOR | Y/R | Bl/W |

| ENGINE STOP SWITCH | IG | BAT7 |
|---|---|---|
| OFF | | |
| RUN | ○ | ○ |
| CORD COLOR | Bl/W | Bl/R |

| IGNITION SWITCH | BAT1 | BAT2 |
|---|---|---|
| ON | ○ | ○ |
| OFF | | |
| LOCK | | |
| CORD COLOR | R | R/Bl |

| LIGHTING SWITCH | (HL) | BAT4 | TL | BAT5 |
|---|---|---|---|---|
| ● | | | | |
| ≡○○≡ | | | ○ | ○ |
| ☼ | ○ | ○ | ○ | ○ |
| CORD COLOR | | Bl/Bu | Br | Bl/Br |

| DIMMER SWITCH | HI | (HL) | LO |
|---|---|---|---|
| HI | ○ | ○ | |
| (N) | ○ | ○ | ○ |
| LO | | ○ | ○ |
| CORD COLOR | Bu | | W |

Bu/W

| TURN SIGNAL SWITCH | L | W | R |
|---|---|---|---|
| ⇦ | ○ | ○ | |
| (N) | | | |
| ⇨ | | ○ | ○ |
| CORD COLOR | O | Gr | Lb |

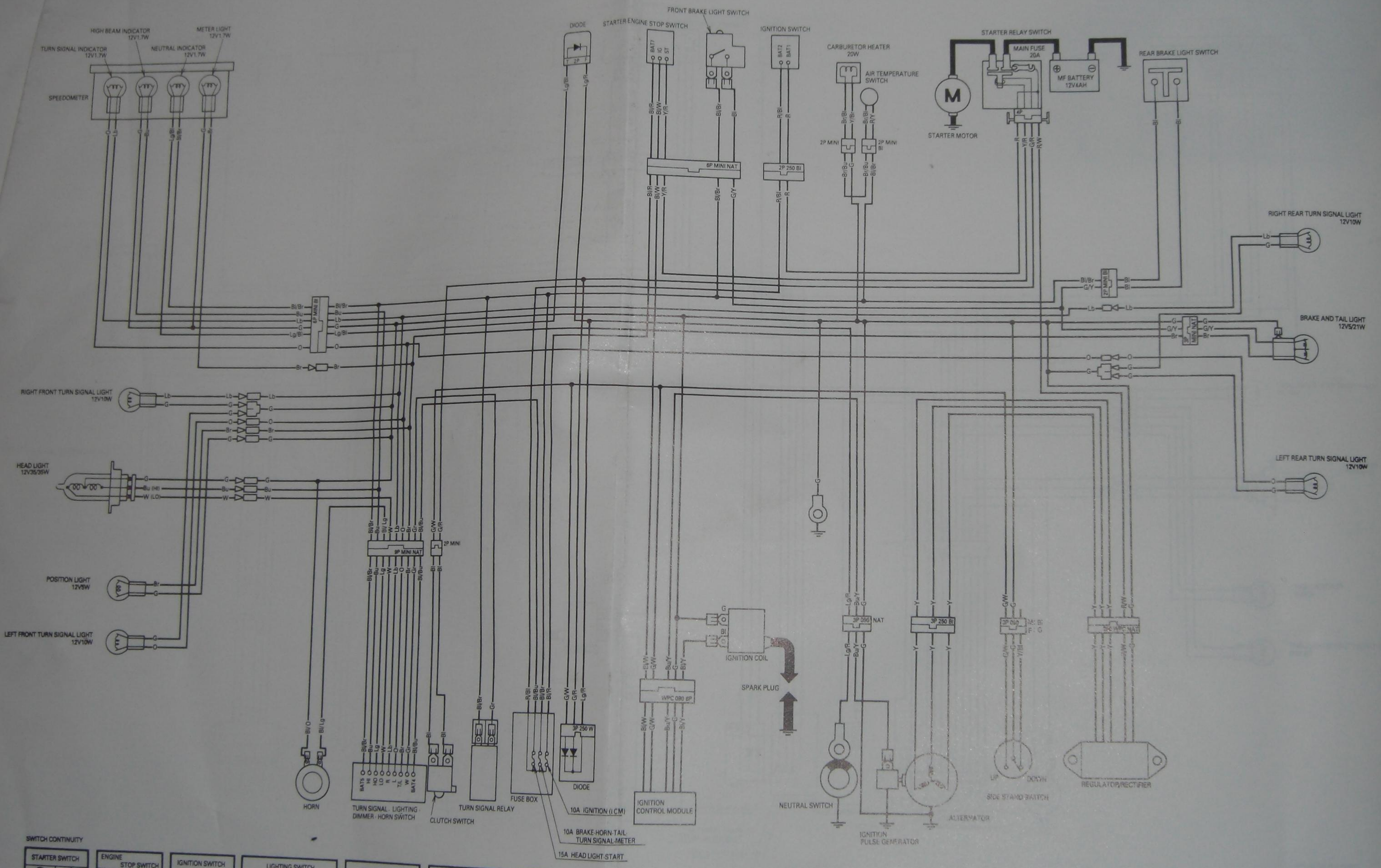
| HORN SWITCH | HO | BAT8 |
|---|---|---|
| FREE | | |
| PUSH | ○ | ○ |
| CORD COLOR | Lg | Bl/Br |

| | | | |
|---|---|---|---|
| Bl | BLACK | Br | BROWN |
| Y | YELLOW | O | ORANGE |
| Bu | BLUE | Lb | LIGHT BLUE |
| G | GREEN | Lg | LIGHT GREEN |
| R | RED | P | PINK |
| W | WHITE | Gr | GRAY |

0030Z-KFT-6200

# WIRING DIAGRAM

## E ype:



HIGH BEAM INDICATOR 12V1.7W
TURN SIGNAL INDICATOR 12V1.7W
NEUTRAL INDICATOR 12V1.7W
METER LIGHT 12V1.7W
SPEEDOMETER
DIODE
STARTER ENGINE STOP SWITCH
FRONT BRAKE LIGHT SWITCH
IGNITION SWITCH
CARBURETOR HEATER 20W
AIR TEMPERATURE SWITCH
2P MINI
2P MINI Bl
STARTER RELAY SWITCH
MAIN FUSE 20A
MF BATTERY 12V4AH
STARTER MOTOR
REAR BRAKE LIGHT SWITCH
6P MINI NAT
2P 250 Bl
RIGHT REAR TURN SIGNAL LIGHT 12V10W
BRAKE AND TAIL LIGHT 12V5/21W
LEFT REAR TURN SIGNAL LIGHT 12V10W
RIGHT FRONT TURN SIGNAL LIGHT 12V10W
HEAD LIGHT 12V35/35W
POSITION LIGHT 12V5W
LEFT FRONT TURN SIGNAL LIGHT 12V10W
9P MINI NAT
IGNITION COIL
SPARK PLUG
WPC 090 6P
3P 090 NAT
3P 250 Bl
HORN
TURN SIGNAL · LIGHTING · DIMMER · HORN SWITCH
CLUTCH SWITCH
TURN SIGNAL RELAY
FUSE BOX
3P 250 W
10A IGNITION (I.C.M)
10A BRAKE·HORN·TAIL·TURN SIGNAL·METER
15A HEAD LIGHT·START
IGNITION CONTROL MODULE
NEUTRAL SWITCH
IGNITION PULSE GENERATOR
ALTERNATOR
SIDE STAND SWITCH
UP
DOWN
REGULATOR/RECTIFIER

SWITCH CONTINUITY

| STARTER SWITCH | ST | IG |
|---|---|---|
| FREE | | |
| PUSH | ○ | ○ |
| CORD COLOR | Y/R | Bl/W |

| ENGINE STOP SWITCH | IG | BAT7 |
|---|---|---|
| OFF | | |
| RUN | ○ | ○ |
| CORD COLOR | Bl/W | Bl/R |

| IGNITION SWITCH | BAT1 | BAT2 |
|---|---|---|
| ON | ○ | ○ |
| OFF | | |
| LOCK | | |
| CORD COLOR | R | R/Bl |

| LIGHTING SWITCH | (HL) | BAT4 | TL | BAT5 |
|---|---|---|---|---|
| ● | | | | |
| ≡○○≡ | | | ○ | ○ |
| ☼ | ○ | ○ | ○ | ○ |
| CORD COLOR | | Bl/Bu | Br | Bl/Br |

| DIMMER SWITCH | HI | (HL) | LO |
|---|---|---|---|
| ≣D | ○ | ○ | |
| (N) | ○ | ○ | ○ |
| ≣D | | ○ | ○ |
| CORD COLOR | Bu | | W |

Bu/W

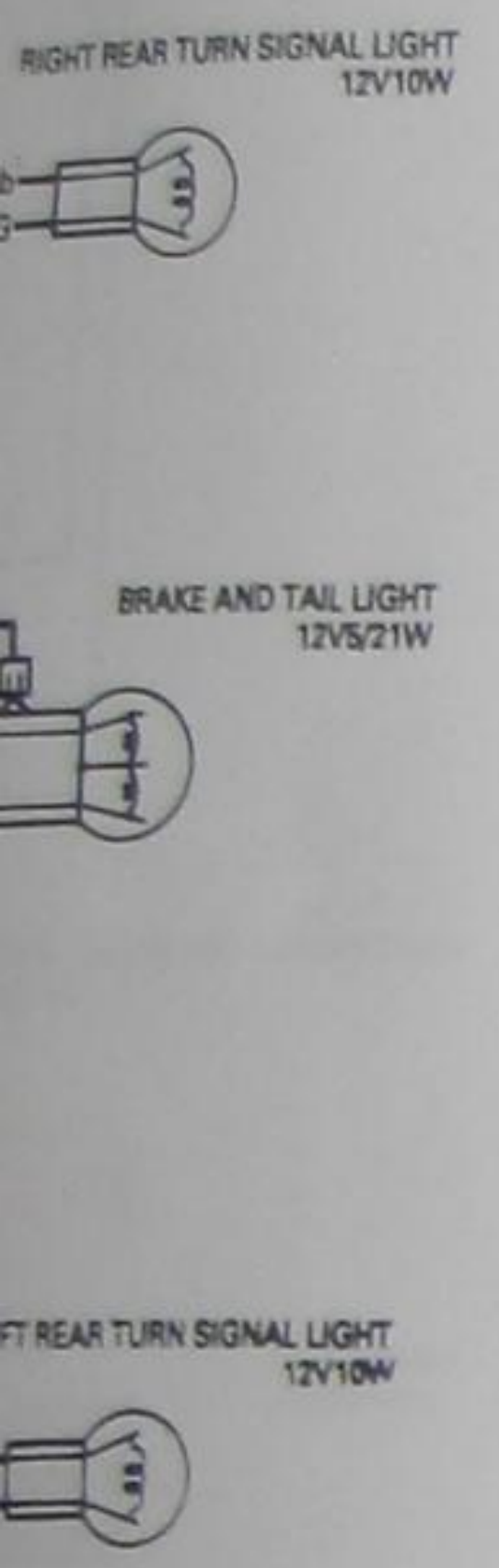
| TURN SIGNAL SWITCH | L | W | R |
|---|---|---|---|
| ⇦ | ○ | ○ | |
| (N) | | | |
| ⇨ | | ○ | ○ |
| CORD COLOR | O | Gr | Lb |

| HORN SWITCH | HO | BAT6 |
|---|---|---|
| FREE | | |
| PUSH | ○ | ○ |
| CORD COLOR | Lg | Bl/Br |

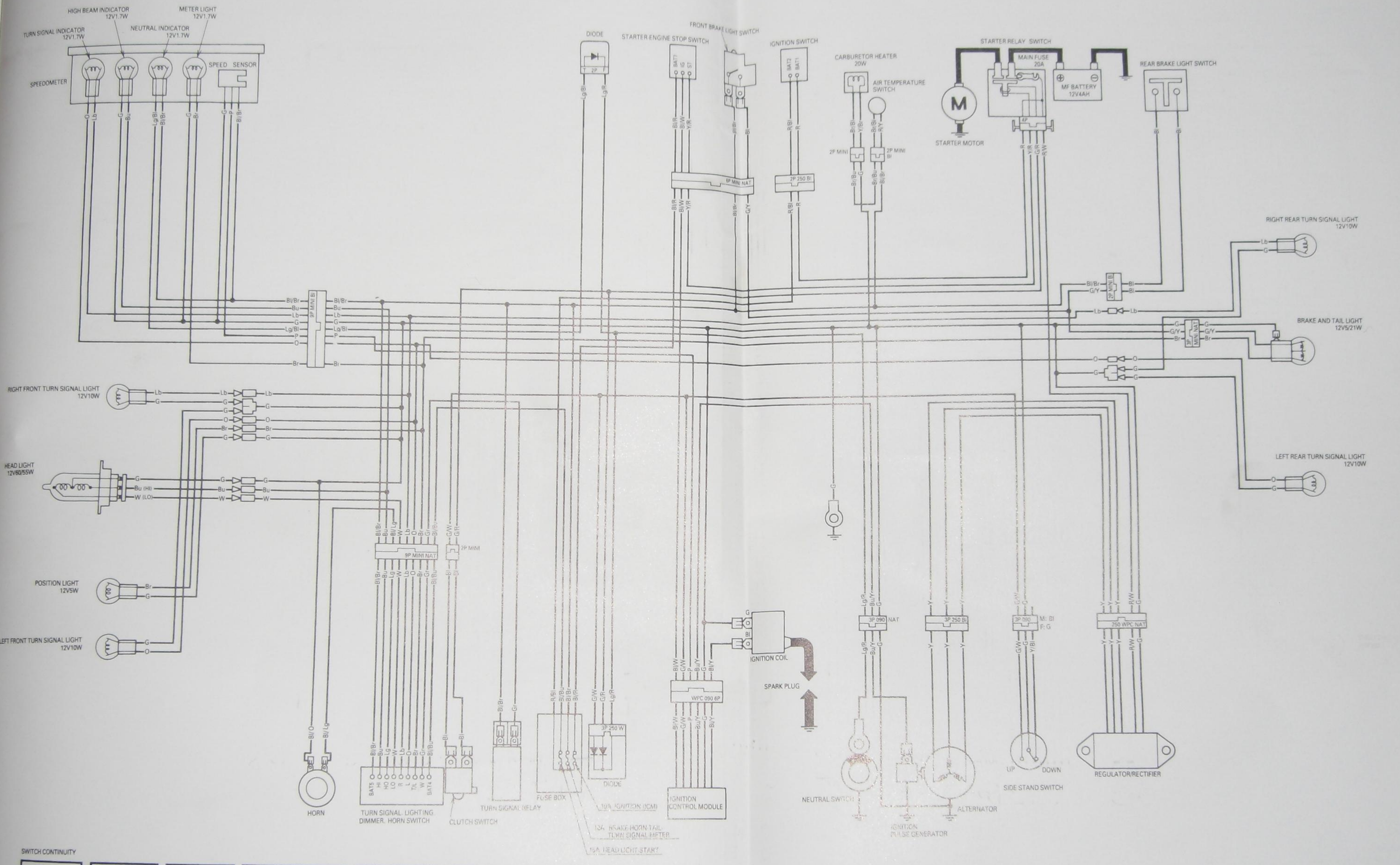
| | | | |
|---|---|---|---|
| Bl | BLACK | Br | BROWN |
| Y | YELLOW | O | ORANGE |
| Bu | BLUE | Lb | LIGHT BLUE |
| G | GREEN | Lg | LIGHT GREEN |
| R | RED | P | PINK |
| W | WHITE | Gr | GRAY |

0030Z-KFT-6000

## IIG type:


RIGHT REAR TURN SIGNAL LIGHT
12V10W
BRAKE AND TAIL LIGHT
12V5/21W
FT REAR TURN SIGNAL LIGHT
12V10W

IIG type:


HIGH BEAM INDICATOR
12V1.7W
METER LIGHT
12V1.7W
TURN SIGNAL INDICATOR
12V1.7W
NEUTRAL INDICATOR
12V1.7W
SPEEDOMETER
SPEED SENSOR
DIODE
T 2P F
STARTER ENGINE STOP SWITCH
BAT7 IG ST
FRONT BRAKE LIGHT SWITCH
IGNITION SWITCH
BAT2 BAT1
CARBURETOR HEATER
20W
AIR TEMPERATURE
SWITCH
2P MINI
2P MINI
Bl
STARTER RELAY SWITCH
MAIN FUSE
20A
MF BATTERY
12V4AH
4P
STARTER MOTOR
REAR BRAKE LIGHT SWITCH
9P MINI NAT
2P 250 Bl
9P MINI Bl
3P MINI Bl
2P MINI Bl
RIGHT REAR TURN SIGNAL LIGHT
12V10W
BRAKE AND TAIL LIGHT
12V5/21W
LEFT REAR TURN SIGNAL LIGHT
12V10W
RIGHT FRONT TURN SIGNAL LIGHT
12V10W
HEAD LIGHT
12V60/55W
Bu (HI)
W (LO)
POSITION LIGHT
12V5W
LEFT FRONT TURN SIGNAL LIGHT
12V10W
9P MINI NAT
2P MINI
HORN
BAT5 HI HO LO R L T/L W BAT4
TURN SIGNAL. LIGHTING
DIMMER. HORN SWITCH
CLUTCH SWITCH
TURN SIGNAL RELAY
FUSE BOX
10A IGNITION (ICM)
12A BRAKE HORN TAIL
TURN SIGNAL METER
15A HEAD LIGHT START
3P 250 W
DIODE
WPC 090 6P
IGNITION
CONTROL MODULE
IGNITION COIL
SPARK PLUG
3P 090 NAT
3P 250 Bl
3P 090 M: Bl F: G
250 WPC NAT
NEUTRAL SWITCH
IGNITION
PULSE GENERATOR
ALTERNATOR
UP DOWN
SIDE STAND SWITCH
REGULATOR/RECTIFIER
Bl/Br Bu Lb G Lg/Bl P O Br
O Lb G Bu Lg/Bl Bl/Br G Br G P Bl/Br
Lg/Bl Lg/R
Bl/R Bl/W Y/R
Bl/Br Bl
R/Bl R
Br/Bl Y/Br Br/Bl R/Y
R Y/R G/R R/W
Bl Bl
Bl/Br G/Y Bl
Lb G
G/Y Br
O G
Bl/Br Bu Lg W Lb O Br Gr Bl/Bu
Bl/O Bl/Lg
Bl Bl
Bl/Br Gr
R/Bl Bl/Bu Bl/Br Bl/R
G/W G/R Lg/R
Bl/W G/W P Bu/Y G Bl/Y
G Bl
Lg/R Bu/Y G
Y Y Y
G/W G Y/Bl
Y Y Y R/W G

SWITCH CONTINUITY

| STARTER SWITCH | | |
|---|---|---|
| | ST | IG |
| FREE | | |
| PUSH | ○ | ○ |
| CORD COLOR | Y/R | Bl/W |

| ENGINE STOP SWITCH | | |
|---|---|---|
| | IG | BAT7 |
| OFF | | |
| RUN | ○ | ○ |
| CORD COLOR | Bl/W | Bl/R |

| IGNITION SWITCH | | |
|---|---|---|
| | BAT1 | BAT2 |
| ON | ○ | ○ |
| OFF | | |
| LOCK | | |
| CORD COLOR | R | R/Bl |

| LIGHTING SWITCH | | | | |
|---|---|---|---|---|
| | (HL) | BAT4 | TL | BAT5 |
| ● | | | | |
| ⊙ | | | ○ | ○ |
| ☼ | ○ | ○ | ○ | ○ |
| CORD COLOR | | Bl/Bu | Br | Bl/Br |

| DIMMER SWITCH | | | |
|---|---|---|---|
| | HI | (HL) | LO |
| ≡D | ○ | ○ | |
| | ○ | ○ | ○ |
| ≡D | | ○ | ○ |
| CORD COL | Bu | | W |

Bu/W

| TURN SIGNAL SWITCH | | | |
|---|---|---|---|
| | L | W | R |
| ⇦ | ○ | ○ | |
| (N) | | | |
| ⇨ | | ○ | ○ |
| CORD COLOR | O | Gr | Lb |

| HORN SWITCH | | |
|---|---|---|
| | HO | BAT8 |
| FREE | | |
| PUSH | ○ | ○ |
| CORD COLOR | Lg | Bl/Br |

| | | | |
|---|---|---|---|
| Bl ····· | BLACK | Br ····· | BROWN |
| Y ····· | YELLOW | O ····· | ORANGE |
| Bu ····· | BLUE | Lb ····· | LIGHT BLUE |
| G ····· | GREEN | Lg ····· | LIGHT GREEN |
| R ····· | RED | P ····· | PINK |
| W ····· | WHITE | Gr ····· | GRAY |

# 20. Troubleshooting

ENGINE DOES NOT START OR IS HARD TO START 20-1
ENGINE LACKS POWER 20-2
POOR PERFORMANCE AT IDLE AND LOW SPEED 20-3
POOR PERFORMANCE AT HIGH SPEED 20-4
POOR HANDLING 20-4

## Engine Does Not Start Or Is Hard To Start

**Possible Cause**

1. Check if fuel is getting to carburetor by loosening drain screw — Not getting to carburetor →
   - No fuel in fuel tank
   - Clogged fuel line
   - Clogged fuel strainer
   - Clogged fuel tank filter screen
   - Sticking flat valve
   - Clogged fuel tank cap breather hole

Getting to carburetor

2. Perform spark test — Wear or no spark →
   - Faulty spark plug
   - Fouled spark plug
   - Faulty ignition control module
   - Faulty ignition pulse generator
   - Broken or shorted spark plug wire
   - Faulty ignition coil
   - Faulty ignition switch
   - Poorly connected, broken or shorted ignition system wires

Good spark

3. Test cylinder compression — Low compression →
   - Incorrect valve seat contact
   - Valve clearance too small
   - Valve stuck open
   - Worn cylinder head gasket
   - Damaged cylinder head gasket
   - Seized valve
   - Improper valve timing

Normal compression

4. Start by following normal starting procedure — Engine starts but soon stops →
   - Air leaking past carburetor insulator
   - Misadjusted idle speed
   - Clogged carburetor
   - Improper ignition timing
   - Fuel/air mixture to lean

Engine does not start

5. Remove and check spark plug — Wet spark plug →
   - Carburetor choke excessively closed (ON)
   - Flooded carburetor
   - Fuel/air mixture too rich
   - Clogged air cleaner

20
21

## Engine Lacks Power

| | | Possible Cause |
|---|---|---|
| 1. Raise wheel off the ground and spin by hand<br>Wheel spins freely | Wheel does not spin freely | • Brake dragging<br>• Worn or damaged wheel bearings<br>• Wheel bearing needs lubrication<br>• Drive chain too tight |
| 2. Check tire pressure<br>Normal pressure | Pressure too low | • Faulty tire valve<br>• Punctured tire |
| 3. Check for clutch slipping<br>Clutch does not slip | Clutch slips | • Weak clutch springs<br>• Worn clutch discs<br>• Warped clutch plates<br>• Misadjusted clutch lever free play<br>• Sticking clutch lifter mechanism |
| 4. Lightly accelerate engine<br>Engine speed increase | Engine speeds does not increase | • Fuel/air mixture too rich or lean<br>• Clogged air cleaner<br>• Restricted fuel flow<br>• Clogged fuel tank cap breather hole<br>• Clogged muffler |
| 5. Check ignition timing<br>Correct | Incorrect | • Faulty ignition control module<br>• Faulty ignition pulse generator<br>• Improperly installed ignition pulse generator |
| 6. Test cylinder compression<br>Normal compression | Low compression | • Incorrect valve seat contact<br>• Valve clearance too small<br>• Valve stuck open<br>• Worn cylinder and piston rings<br>• Damaged cylinder head gasket<br>• Seized valve<br>• Improper valve timing |
| 7. Check carburetor for clogging<br>Not clogged | Clogged | • Carburetor not serviced frequently enough |
| 8. Remove and check spark plugs<br>Good condition | Fouled or discolored | • Spark plug not serviced frequently enough<br>• Use of spark plug with improper heat range |
| 9. Remove oil filler cap/dipstick, and check oil level and condition<br>Correct | Incorrect | • Oil level too high<br>• Oil level too low<br>• Contaminated oil |

To page 20-3

From page 20-2

| | | Possible Cause |
|---|---|---|
| 10. Remove cylinder head cover and inspect lubrication<br>Valve train lubricated properly | Valve train not lubricated properly | • Clogged oil passage<br>• Faulty oil pump<br>• Clogged oil strainer screen |
| 11. Check for engine overheating<br>Engine does not overheat | Engine overheats | • Excessive carbon build-up on combustion chamber<br>• Use of improper quality of fuel<br>• Clutch slipping<br>• Fuel/air mixture too lean |
| 12. Accelerate or run at high speed | Engine knocks | • Excessive carbon build-up on combustion chamber<br>• Use of improper quality of fuel<br>• Worn cylinder and piston<br>• Fuel/air mixture to lean<br>• Ignition timing too advanced (faulty ignition control module) |

## Poor Performance At Idle And Low Speed

| | | Possible Cause |
|---|---|---|
| 1. Check ignition timing and valve clearance<br>Correct | Incorrect | • Faulty ignition control module<br>• Faulty ignition pulse generator<br>• Improperly installed ignition pulse generator<br>• Improperly adjusted valve clearance |
| 2. Check carburetor pilot screw adjustment<br>Correct | Incorrect | • Fuel/air mixture too lean<br>• Fuel/air mixture too rich |
| 3. Check for air leaking past carburetor insulator<br>Not leaking | Leaking | • Loose carburetor insulator bolts<br>• Damaged carburetor insulator<br>• Damaged or deteriorated insulator O-ring |
| 4. Perform spark test<br>Good spark | Wear or intermittent spark | • Faulty spark plug<br>• Fouled spark plug<br>• Faulty ignition control module<br>• Faulty ignition pulse generator<br>• Broken or shorted spark plug wire<br>• Faulty ignition coil<br>• Poorly connected, broken or shorted ignition system wires |
| 5. Check carburetor for clogging | Clogged | • Clogged carburetor slow circuit |

## Poor Performance At High Speed

| | | Possible Cause |
|---|---|---|
| 1. Check ignition timing | Incorrect → | • Faulty ignition control module<br>• Faulty ignition pulse generator<br>• Improperly installed ignition pulse generator |
| Correct ↓ | | |
| 2. Disconnect fuel line at carburetor | Fuel flow restricted → | • Lack of fuel in fuel tank<br>• Clogged fuel line<br>• Clogged fuel tank filter screen<br>• Clogged fuel strainer<br>• Clogged fuel tank cap breather hole |
| Fuel flows freely ↓ | | |
| 3. Check the carburetor jets for clogging | Clogged → | • Clogged carburetor jets (Clean them) |
| Not clogged ↓ | | |
| 4. Check valve timing | Incorrect → | • Improperly installed cam sprocket |
| Correct ↓ | | |
| 5. Check valve spring | Weak → | • Faulty valve spring |

## Poor Handling

| | Possible Cause |
|---|---|
| 1. If steering is heavy → | • Steering bearing adjustment nut too tight<br>• Damaged steering head bearings |
| 2. If either wheel is wobbling → | • Excessive wheel bearing play<br>• Bent rim or spokes<br>• Loose swingarm pivot bolt<br>• Excessively worn swingarm pivot bushings<br>• Bent frame |
| 3. If motorcycle pulls to one side → | • Faulty shock absorber<br>• Front and rear wheels not aligned<br>• Bent fork<br>• Bent swingarm<br>• Bent frame |

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